TRC
Customer-Focused Solutions

SUPPLEMENTAL FEASIBILITY STUDY
(Revision 2.0)

Prepared for

United States Environmental Protection Agency

Prepared by

TRC
Irvine, California

Representing

The Waste Disposal, Inc. Group (WDIG)

Project No. 94-256
July 2000

TRC
21 Technology Drive
Irvine, California 92618
Telephone (949) 727-9336
Facsimile (949) 727-7399

WASTE DISPOSAL INC.
SUPERFUND SITE
Project Coordinator

July 25, 2000 Project No. 94-256

Ms. Andria Benner
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street, No. H-7-2
San Francisco, California 94105-3901

Transmittal
Supplemental Feasibility Study (Rev. 2.0)
Waste Disposal, Inc. Superfund Site
Santa Fe Springs, California

Dear Ms. Benner:

Enclosed please find two copies of the Supplemental Feasibility Study (SFS), Revision 2.0 for the Waste Disposal, Inc. Superfund Site in Santa Fe Springs, California. This SFS has been completed pursuant to the following requirements and guidance:

- Amended Administrative Order, Docket No. 97-09, Scope of Work, Task No. RD-35.
- *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, EPA, 1988.
- *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, EPA, 1999.
- EPA comments to Rev. 0 of this SFS.
- EPA comments to Rev. 1.0 of this SFS.
- Comments received from EPA during the informal "Work in Progress" review.

As per your verbal approval, a detailed comment response summary is not included in this submittal. However, every effort was made to assure that EPA's concerns and preferences were incorporated to the fullest extent possible. An executive summary section was not included with this revision of the SFS. If such a summary is considered necessary, it can be incorporated into the document at a later time.

We look forward to bringing this project to a successful close with you. Please call with comments or questions.

Very truly yours,

Alley G. Blodgett

for Ian Webster
WDIG Project Coordinator

IW/JB:rm
Enclosures

cc: Mark Filippini, EPA
John Wondolleck, CDM Federal
Bill Coakley, EPA ERT
Tim Crist, CIWMB
Mike Finch, DTSC
Shawn Haddad, DTSC
Dave Becker, Corps of Engineers
Roberto Puga, Project Navigator, Ltd.
Mike Skinner, WDIG
Shelby Moore, Esq., WDIG
Richard Scott, TRC
Boone and Associates, for WDIG

return
to Mark
Filipini

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

PAGE NO.

TABLE OF CONTENTS
(Continued)

LIST OF TABLES

TABLE OF CONTENTS
(Continued)

LIST OF TABLES
(Continued)

TABLE OF CONTENTS
(Continued)

LIST OF TABLES
(Continued)

TABLE OF CONTENTS
(Continued)

LIST OF FIGURES

1.0 INTRODUCTION

1.1 INTRODUCTION AND PURPOSE

1. The purpose of this Supplemental Feasibility Study (SFS) is twofold: (1) identify, screen and evaluate remedial action alternatives for the soils, liquids, soil gas and ground water; and (2) consider issues related to potential future use of the Waste Disposal, Inc. (WDI) Superfund Site located in Santa Fe Springs, California (Site) (see Figures 1.1 and 1.2). This SFS incorporates Site characterization data collected and evaluated after the original Feasibility Study (FS) was placed in the administrative record by the United States Environmental Protection Agency (EPA) in 1993. The EPAs 1993 FS focused primarily on soils. Therefore, further investigations of other Site media, including ground water, soil gas and liquids located within and outside the reservoir boundary, were conducted following the 1993 FS to update previously collected data and to fill in data gaps. Refer to Table 1.1 for a list of Site investigations.

2. In July 1987, the Site was placed on the National Priorities List (NPL). In 1988, EPA erected a fence around the southeast corner of the Site to improve security and prevent accidental exposure to possible surface contamination. Between 1988 and 1989, EBASCO was tasked by the EPA to perform a Remedial Investigation/ Feasibility Study (RI/FS). This process led to the selected remedy for buried waste presented in the Record of Decision (ROD) (EPA, 1993a).

3. The Waste Disposal, Inc. Group (WDIG), initially comprised of the eight Potentially Responsible Parties (PRPs)[(1)] named in the original Administrative Order, Docket No. 94-17, dated December 23, 1993, undertook Predesign and Design activities during 1995 and 1996, and submitted a Predesign/Intermediate (60%) Design (TRC, 1995) and a Prefinal (90%) Design Report (TRC, 1996) to EPA. The 1995 Predesign activities conducted by WDIG focused primarily on soil conditions in Areas 4 and 7.

4. In 1997, EPA named 21 PRPs[(2)] in the Amended Administrative Order, Docket 97-09 (EPA, 1997a). The expanded WDIG undertook additional Remedial Design (RD) investigative

---

(1) Chevron U.S.A., Inc.; The Dia-Log Company; Dresser Industries, Inc.; FMC Corporation; Mobil Oil Corporation; Santa Fe Energy Resources, Inc.; Texaco Inc.; and Union Oil Company.

(2) Archer Daniels Midland; ARCO; Atlantic Oil Company; Bethlehem Steel; Chevron Corporation; Conoco, Inc.; Conopco; DiLo, Inc. (successor to The DiaLog Company); Dresser Industries, Inc.; Exxon; Ferro Corporation; FMC Corporation; Hathaway; Monterey Resources (formerly known as Santa Fe Energy Resources, Inc.); McDonnell Douglas; Mobil Oil Corporation; Santa Fe International Corporation; Shell; Texaco, Inc.; Union Pacific Railroad; and UNOCAL.

activities, plus those requested by EPA in the Amended Scope of Work for Remedial Design (SOW) (EPA, 1997b). The purpose of these investigations was to collect, review and update additional data on ground water, soil, soil gas and liquids located within and outside the reservoir boundary at the Site.

5. In August 1999, WDIG submitted an RD Investigative Activities Summary Report (Rev. 1.0) (TRC, 1999a) to EPA which compiled field data collected at the Site. The purpose of this report was to evaluate and analyze the data collected between 1997 and 1998, compare it with previously collected historical data (1971 to 1995) and, based upon this summary and comparison, present current Site conditions for purposes of completing the FS and RD.

6. After receipt of comments to the SFS from the community and state, EPA will prepare a Proposed Plan presenting alternatives, including their preferred cleanup alternative, for public review and comment. Based on EPAs evaluation of the comments and other relevant considerations, EPA will select a revised remedy and amend the existing ROD (EPA, 1993a). Upon completion of the ROD, the design will be revised accordingly so the a final site remedy can be implemented. Figure 1.3 presents how the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Superfund process has progressed at the Site over time and indicates the remaining steps towards completion.

1.2 FEASIBILITY STUDY PROCESS

1. The FS process involves assessing the data collected during various investigations to systematically determine the most appropriate and cost-effective remedial alternatives for each affected media. Figure 1.4 provides a brief overview of the FS process. Remedial alternatives will be developed for the affected soils and liquids located within or outside the reservoir boundary, soil gas, ground water and indoor air using the "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (EPA, 1988). In July 1999, "A Guide to Preparing Superfund Proposal Plans, Records of Decision, and Other Remedy Selection Decision Documents" was issued by EPA, and also used in preparing this SFS. As indicated in the RI/FS guidance documents, the remedial alternatives are evaluated in the following steps:
   - Identification of technologies by media.
   - Screening of technologies and process options by media.
   - Assembly of preliminary remedial alternatives.

- Detailed analysis for remedial alternatives against the nine criteria in the National Contingency Plan (NCP). The nine criteria are discussed below:
  - Threshold Criteria:
    - **Overall Protection of Human Health and Environment**: Assessment against this criterion describes how the alternative, as a whole, achieves and maintains protection of human health and the environment.
    - **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)**: Under this criterion, an alternative is assessed in terms of compliance with ARARs, or if a waiver is required, how it is justified.
  - Primary Balancing Criteria:
    - **Long-term Effectiveness and Permanence**: Under this criterion, alternatives are assessed for long-term effectiveness in maintaining protection of human health and the environment after response objectives have been met. Magnitude of residual risk, and adequacy and reliability of controls are also taken into consideration.
    - **Reduction of Toxicity, Mobility or Volume (TMV) through Treatment**: Under this criterion, an alternative is assessed in terms of anticipated performance of the specific treatment technologies it employs. Factors such as volume of materials destroyed or treated, degree of expected reduction, or to which treatment is irreversible and the type and quantity of remaining residuals are taken into consideration.
    - **Short-term Effectiveness**: Under this criterion, an alternative is assessed in terms of its effectiveness in protecting human health and the environment during construction and implementation of a remedy before response objectives have been met. The time until the response objectives have been met is also factored into this criterion.
    - **Implementability**: Under this criterion, an alternative is assessed in terms of its technical and administrative feasibility and availability of required goods and services. Also considered is reliability of technology, ability to monitor effectiveness of the remedy and ease of undertaking additional remedial actions, if necessary.
    - **Cost**: Under this criterion, an alternative is assessed in terms of its present worth capital, and operation and maintenance (O&M) costs.
  - Modifying Criteria:
    - **State/support agency acceptance**: Under this criterion, an alternative is assessed in terms of technical and administrative issues and concerns by state and support agencies. This criterion will be addressed in the ROD once comments to the SFS have been received.
    - **Community acceptance**: Under this criterion, an alternative is assessed by issues and concerns of the public. As with the state/support agency acceptance, this criteria will be addressed in the ROD once comments to this SFS have been received.

1.3 REPORT ORGANIZATION

1. This SFS report is organized as follows:

- Executive Summary
- Chapter 1.0 - Introduction
- Chapter 2.0 - Site Characterization
- Chapter 3.0 - Identification of Chemicals of Concern, Associated Risks and Remedial Response Actions
- Chapter 4.0 - Applicable or Relevant and Appropriate Requirements (ARARs)
- Chapter 5.0 - Identification and Preliminary Screening of Remedial Response Measures and Technologies
- Chapter 6.0 - Assembly of Site-Wide Remedial Alternatives
- Chapter 7.0 - Summary and Comparison of Site-Wide Remedial Alternatives
- Chapter 8.0 - References
- Chapter 9.0 - Acronyms and Abbreviations
- Appendix A - Assumptions for Cost Estimates - Full Excavation Alternative
- Appendix B - Assumptions for Cost Estimates - Alternatives 1 through Alternatives 8
- Appendix C - Aerial Photographs

TABLE 1.1

LIST OF MAJOR SITE INVESTIGATION REPORTS FROM 1971 THROUGH 1999 WASTE DISPOSAL, INC. SUPERFUND SITE

REPORT TITLE	SUBMITTED BY	DATE
Foundation Investigation Proposed Industrial Building 12707 East Los Nietos Road, Santa Fe Springs, California	Advanced Foundation Engineering, Inc.	1971
Fill Investigation and Preliminary Soils Study	Hammond Soils Engineering	1975
Foundation Investigation	Moore & Tabor	1981
Summary of Findings Preliminary Site Characterization, Waste Disposal, Inc.	Dames & Moore	1984
Summary of Findings Phase II Investigation, Waste Disposal, Inc. Site	Dames & Moore	1985
Draft Summary of Findings Field Investigation Campbell Property	Dames & Moore	1986
Report Soil Sampling Program, Toxo Spray-Dust, Inc. Site	Dames & Moore	1986
Soils Investigation	John L. Hunter & Assoc.	1987
Media (Soils, Soil Gas and Ground Water) Characterization Reports	EBASCO	1988
Final Remedial Investigation Report	EBASCO	1989
Final Endangerment Assessment	EBASCO	1989
Feasibility Study Report for Soils and Subsurface Gas	EPA	1993
Predesign and Intermediate (60%) Design Report *Soils and Subsurface Gas Remedial Design*	TRC	1995
Prefinal (90%) Design Report *Soils and Subsurface Gas Remedial Design*	TRC	1996
Subsurface Gas Contingency Plan	EPA	1997
Technical Memorandum No.7 - Vapor Well Construction Details	TRC	1997
Endangerment Assessment	Frank Hovare & Associates	1998
Area 7 Geoprobe Characterization Report	ERTC	1998
Technical Memorandum No. 11 - Reservoir Area Grading Plans and Waste/Debris Management As-Built Report	TRC	1998
Technical Memoranda Nos. 6, 8 and 12 - Reservoir Liquids Testing, Report of Findings	TRC	1998
Phase II - Reservoir Interior Test Trench Excavation, Report of Findings (Rev. 0)	TRC	1998
Technical Memorandum No. 10 - Additional Soil Sampling for Leachability Testing, Report of Findings	TRC	1998
Reservoir Physical and Chemical Characterization Report, Volumes 1 and 2	ERTC	1999
Vacuum-Enhanced Total Liquids Extraction Testing Report	ERTC	1999
Subsurface Gas Contingency Plan Investigation Report	CDM Federal	1999
Subsurface Gas Contingency Plan Investigation Report Addendum, July 1998	CDM Federal	1999
Vapor Well Installation and Sampling Results	CDM Federal	1999
Report of Investigation of Reservoir Liquids Piezometer Installation	CDM Federal	1999
Ground Water Data Evaluation Report	CDM Federal	1999
1998 Annual Soil Gas Monitoring Report	TRC	1999
1998 Annual In-Business Air Monitoring Report	TRC	1999
Technical Memorandum No. 9A - Soil Vapor Extraction Testing, Report of Findings	TRC	1999
1998 Annual Ground Water Monitoring Report	TRC	1999
Remedial Design Investigative Activities Summary Report (Revision 1.0)	TRC	1999
Addendum - Technical Memorandum No. 13 - Pilot-Scale Treatability Study for Reservoir Liquids Removal (Revision 1.0)	TRC	1999

94-256/Rpts/SFS(Rev. 2.0) (7/21/00/rm)

94-256RSFS-12 REV. 07/24/00

REV. 2.0
DRAFT

REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP OF WHITTIER, CALIFORNIA, DATED 1981.

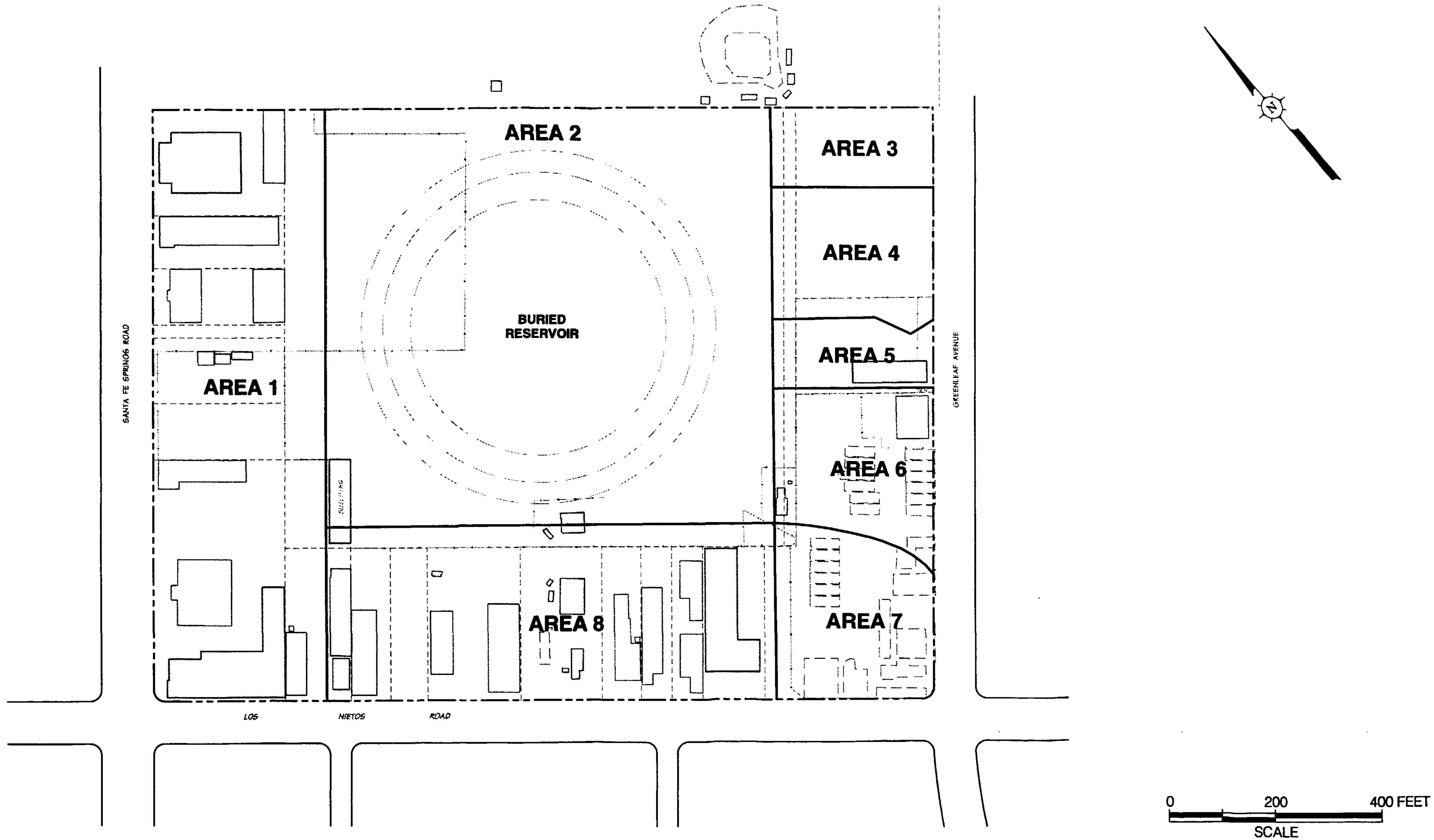
SITE LOCATION MAP

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 1.1

94-256RSFS-02 REV. 07/24/00



LEGEND

SITE BOUNDARY

SITE AREA BOUNDARY

FENCE

EXISTING BUILDING/STRUCTURE

PROPERTY BOUNDARY

REFERENCE: NUNEZ ENGINEERING, SURVEY DRAWING NE 97187, OCT. 31, 1997

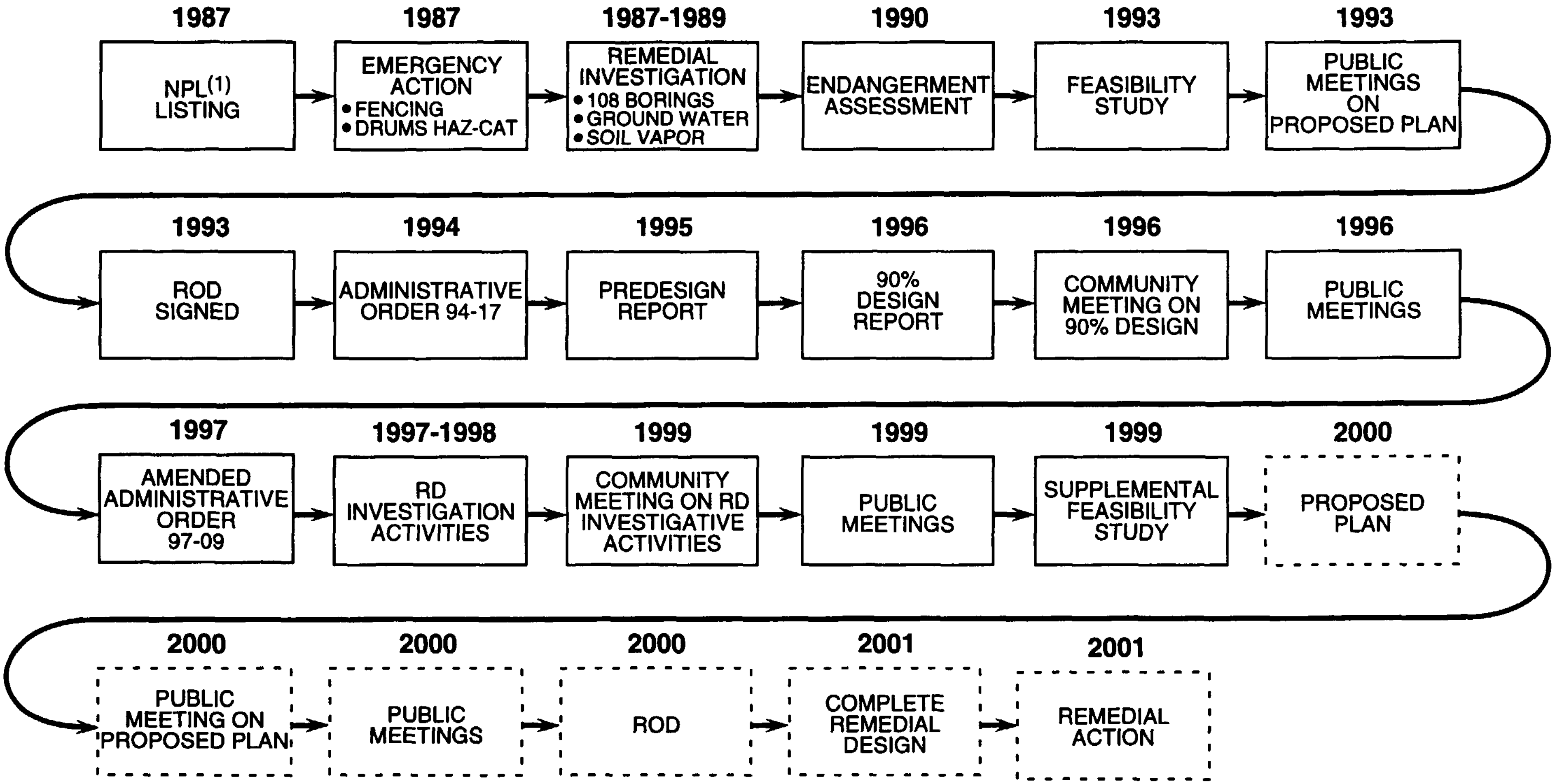
REV. 2.0
DRAFT

SITE FEATURES

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 1.2



= TO BE COMPLETED

(1) NATIONAL PRIORITY LIST.

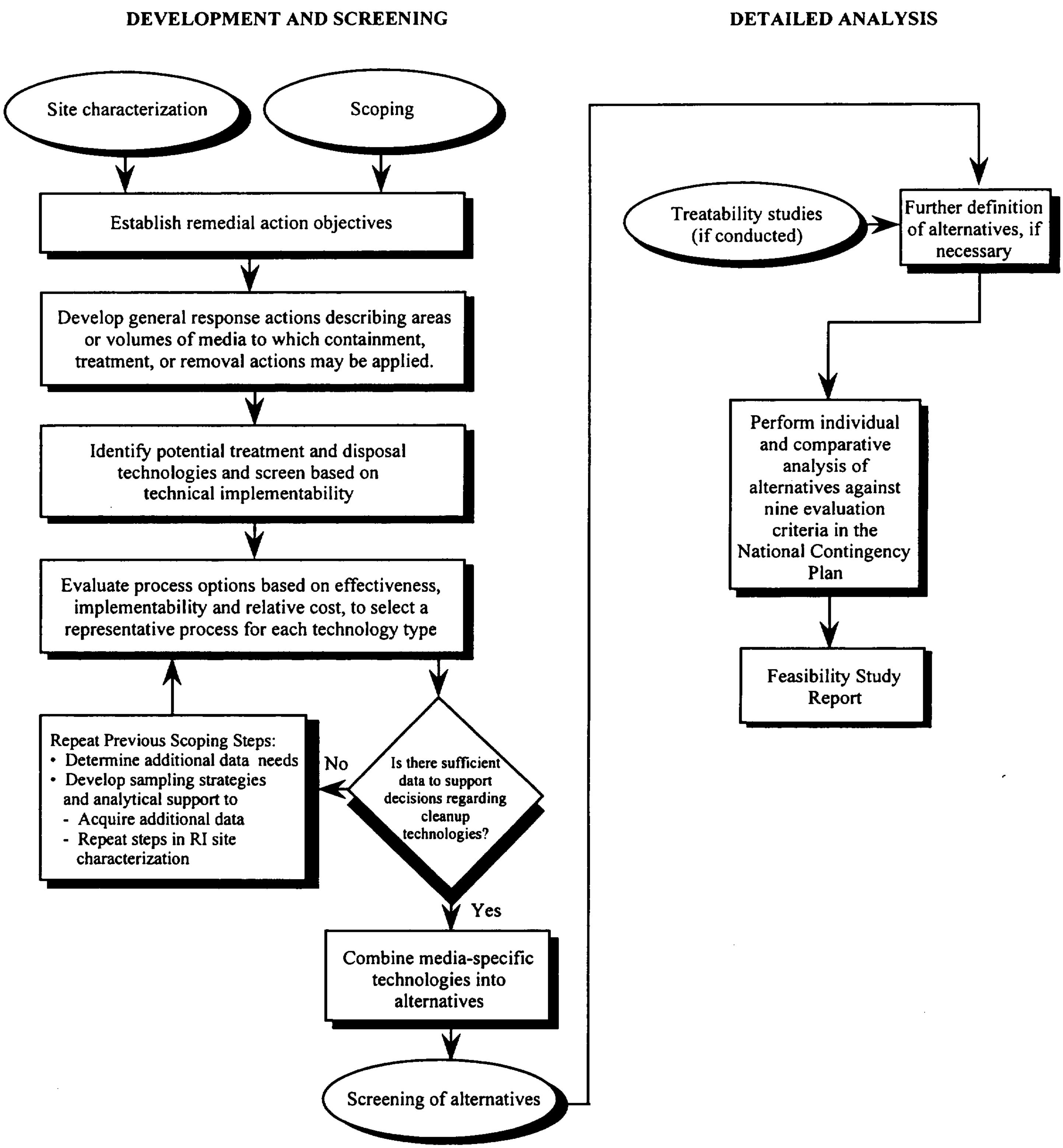
REV. 2.0 DRAFT

CERCLA (SUPERFUND) PROCESS TIMELINE AT WDI SITE

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 1.3



Reference: Guidance for Conducting Remedial Investigations and Feasibility Studies at CERCLA Sites, USEPA 540R-89-001

REV. 2.0
DRAFT

FEASIBILITY STUDY PROCESS

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 1.4

2.0 SITE CHARACTERIZATION

2.1 CURRENT CONDITIONS AND SITE HISTORY

2.1.1 CURRENT CONDITIONS

1. The Site is located in Santa Fe Springs, Los Angeles County, California on an approximately 40-acre parcel of land (see Figures 1.1 and 1.2). The Site is currently bordered on the northwest by Santa Fe Springs Road, on the northeast by the former Fedco Distribution Center and St. Paul High School, on the southwest by Los Nietos Road, and on the southeast by Greenleaf Avenue.

2. For descriptive purposes, EPA has subdivided the Site into eight areas (Areas 1 through 8) as shown in Figure 1.2. The eight areas are comprised of 22 parcels, 19 on which various businesses (e.g., machine shops, auto repair shops, small commercial businesses and light industrial complexes) are currently operating. Investigations suggest that 3 of the 19 parcels have structures located over buried waste. The remaining 3 of the 22 parcels are currently unoccupied. Areas 1 and 8 of the Site are occupied by several light industrial complexes and small commercial businesses. A buried 42-million-gallon-capacity reservoir is located in the central portion of Area 2. The northwestern portion of the reservoir area is covered with an asphalt parking lot and used for recreational vehicle (RV) storage. The remaining portion of Area 2 is undeveloped. Areas 3 through 7 extend along Greenleaf Avenue. Areas 3 and 4 are undeveloped and are the closest property boundary to nearby residential areas (approximately 50 feet). One structure located in Area 5 is used for a commercial business. Areas 6 and 7 are undeveloped and contain several concrete foundations that remain from previous structures.

2.1.1.1 Regional Geology

1. The Site is located northwest of the Santa Ana Mountains, which form the eastern boundary of the Los Angeles Basin. The Site is bound on the northeast by the La Habra Syncline, and on the southwest by the Coyote Hills (Santa Fe Springs) Anticline in an area commonly referred to as the Santa Fe Springs Plain. This Plain is a gently rolling topographic feature that slopes both to the northeast toward Whittier and to the southeast toward the Downey Plain.

2. Site-specific geology can be found in the Final Soil Characterization Report (EBASCO, 1989a) and the RD Investigative Activities Summary Report (Rev. 1.0) (TRC, 1999a). Soil boring logs and cross sections indicate that the upper 100 feet of strata

beneath the Site consist of fluvial deposits. These deposits are coarse-grained, occasionally pebbly, channelized sands surrounded in places by finer-grained laterally extensive beds, suggesting that a braided river system formed the near surface deposits. The variable thickness (3 to 20 feet) and lateral extent (30 to 1,500 plus feet) of channel deposits underlying the Site is a result of continuous, active fluvial channel-cutting events.

3. Detailed cross sections shown in the Soil Characterization Report, as well as other reports (e.g., RD Investigative Activities Workplan [TRC, 1997a], TM No. 7 - Vapor Well Construction Details [TRC, 1997b], Phase II - Reservoir Interior Test Trench Excavation Report of Findings [TRC, 1999a], Ground Water Data Evaluation Report [CDM Federal, 1999a], Annual Ground Water Monitoring Report [TRC, 1999a]) point out local stratigraphic variations onsite. These variations can be summarized as follows:

   - Five to 15 feet of fill material covers most of the Site (5 feet at the north end and 15 feet at the south end of Area 2). The fill material typically consists of compacted, dry silty sand. Below depths of about 3 feet to 6 feet bgs the fill frequently contains some construction debris (e.g., chunks of concrete, wood, etc.).
   - Below the fill material, except in selected portions of Areas 2, 4, 5, 6, 7 and 8 where there is buried waste ranging in depth from 5 to 30 feet below ground surface (bgs), is a silt layer ranging from 10 to 25 feet in thickness across the entire Site.
   - Below the silt layer are channelized, braided river deposits at least 50 feet thick.
   - A clay and silt layer about 10 feet thick and from 30 to 40 feet bgs is present under approximately 25 percent of the Site, predominantly at the southeast end of the Site and is interbedded with channelized, braided river deposits.
   - The apparent direction of sediment transport is in a northwesterly-southeasterly direction. The northeasterly-southwesterly trending cross sections appear to transect individual channel profiles, whereas northwesterly-southeasterly trending cross sections appear to trend parallel to the axis of individual channels. An exception to this apparent northwesterly-southeasterly direction of sediment transport can be found in the eastern corner of the Site, where the network of channels is more unpredictable.
   - Coarser-grained strata above the water table are typically overlain by finer-grained deposits. Evidence of a confining layer above the water table does not exist and available data suggests that it is unlikely. Small, localized clay and silt terraces are evident, but appear to be of insufficient size or extent to be characterized as a low-permeability barrier, which could provide containment.

2.1.1.2 Regional Hydrogeology

1. The Site is situated in the Whittier Area of the Central Ground Water Basin. The Whittier Area extends from Puente Hills south and southwest of the Site to the axis of Santa Fe Springs-Coyote Hills uplift. The western boundary is an arbitrary line separating the Whittier area from the Montebello Forebay area, and the eastern boundary is the Los Angeles-Orange County boundary. The Whittier area is overlain by the La Habra Piedmont Slope and part of the Santa Fe Springs Plain and Coyote Hills. Known water-bearing sediments, extending to a depth of about 1,000 feet (800 feet below mean sea level [msl]), include recent alluvium and the Lakewood and San Pedro Formations.

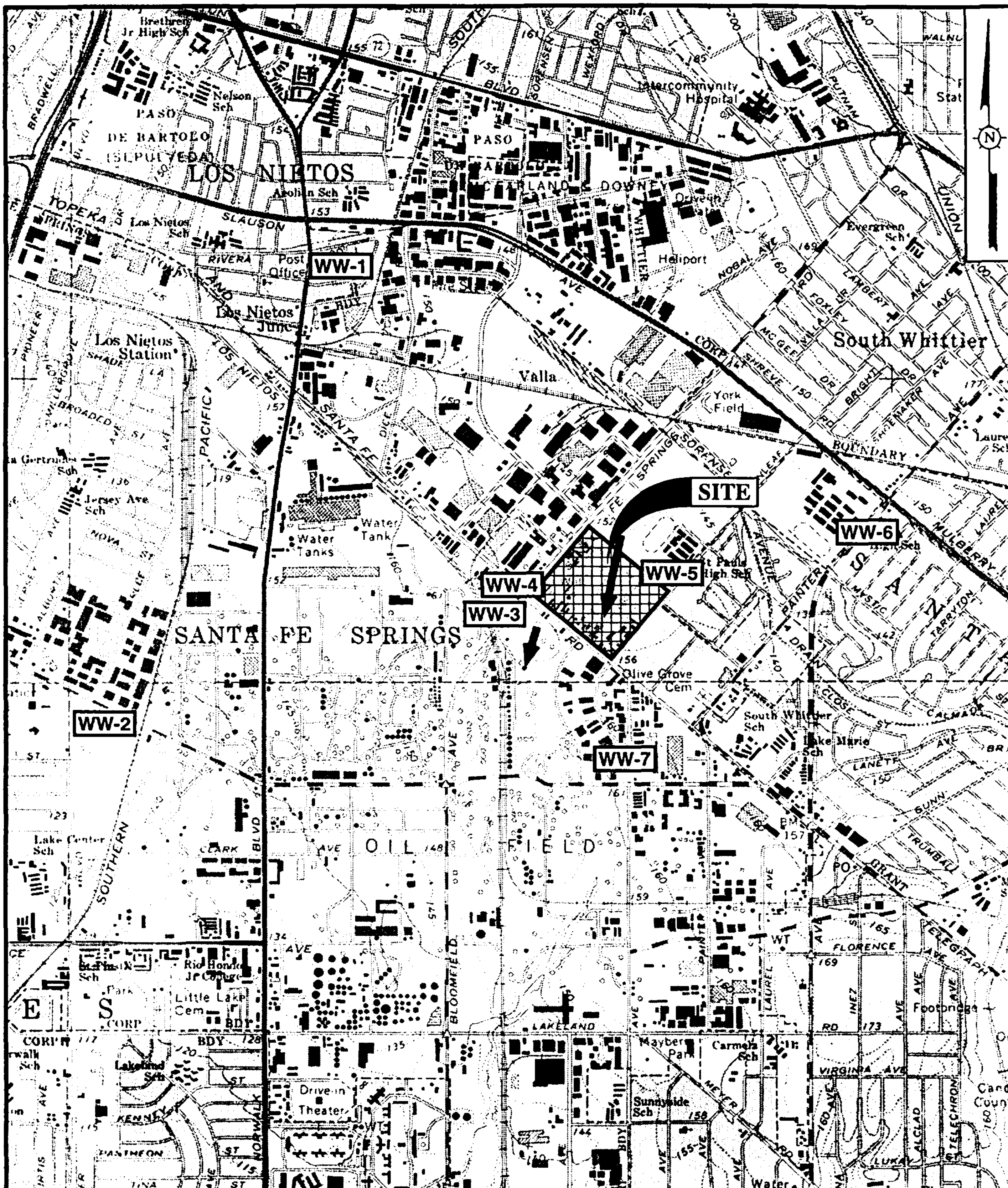
2. Ground water immediately below the Site is generally located from 31 to 51 feet bgs and from 106 to 118 feet above msl. This places the aquifer approximately 28 feet below the bottom of the reservoir and 25 feet below the bottom of the buried waste. Figure 2.22 in the RD Investigative Activities Summary Report (Rev. 1.0) (TRC, 1999a) shows the elevation of ground water at the Site during June 1995. However, recent ground water level measurements show the ground water to be approximately 22 feet below the bottom of the reservoir and approximately 15 feet below the buried waste. Direction of ground water flow is generally southwesterly.

2.1.1.3 Water Resources

1. CDM Federal contacted the State of California, Department of Health Services, Drinking Water Field Operations Branch and the City of Santa Fe Springs Water Division to update information regarding the status of water supply wells near the Site (CDM Federal, 1999a). State and local agency records showed seven water supply wells located near the Site. According to Mr. Ron Hughes with the City of Santa Fe Springs, only two municipal water supply wells are located within 2 miles of the Site (see Figure 2.1). One well (WW-1) is located upgradient of the Site, approximately 1 mile to the northeast. This active well is owned by the City of Santa Fe Springs. The second well (WW-2), which is inactive, is also owned by the City of Santa Fe Springs, and is cross-gradient to the Site, approximately 1.4 miles to the west.

2. Information regarding the remaining five water supply wells near the Site was obtained from the Final Groundwater Characterization Report (EBASCO, 1989b). Well WW-3, located on the south side of Los Nietos Road, was owned by Southern California Edison, but reportedly has

94-256RSFS-22 REV. 07/24/00



0 2,000 4,000 FEET

SCALE

LEGEND

WW-1 WATER SUPPLY WELL

GROUNDWATER FLOW DIRECTION

REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP OF WHITTIER, CALIFORNIA, DATED 1981.

REV. 2.0 DRAFT

LOCATION OF WATER SUPPLY WELLS IN VICINITY OF WDI

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 2.1

been abandoned. Well WW-7, located south of Los Nietos Road between Greenleaf and Painter Avenues, was capped in 1957, but according to the EBASCO report, was active as of 1979. Well WW-5, according to the EBASCO report, is owned by the City of Santa Fe Springs and is located northwest of the Site. Well WW-6, owned by Whittier Union High School District, is located at the southeast corner of Painter Avenue and Mulberry Drive. Well WW-4 was reported by EBASCO to be located on the Site, but no other information is available. This well has not been encountered in any field investigation of the Site.

2.1.1.4 Sensitive Environments

1. In August 1998, Frank Hovare & Associates conducted an investigation to determine the possibility of native wildlife occupying the Site (Hovare and Associates, 1998). Results from the investigation indicated that evidence of sensitive or protected species activity was not found within the property boundaries, nor would such species be likely to occupy the Site, given its history of surface disturbances, site drainage control actions and existing human intrusion from adjacent development. For a complete description of Frank Hovare & Associates' findings, refer to their Endangerment Assessment dated August 1998.

2.1.1.5 Current and Potential Future Land and Resource Uses

1. The current onsite land uses include the following:
   - Vacant land.
   - Light industrial activities, such as:
     - Automotive repair.
     - Wood laminating.
     - Plastics fabrication.
     - Tool and die work.
     - Machining.
     - Fabrication.
   - Heavy equipment rentals.

2. Current adjacent/surrounding land uses include the following:
   - A private high school.
   - Residential.
   - Light industrial.
   - Distribution centers.
   - Utility installations.
   - Office space.
   - Vacant land.

3. The Site is located in the City of Santa Fe Springs, California. Santa Fe Springs is located on the edge of Los Angeles County between Orange County and central Los Angeles. This area is called the "Mid-Counties," consisting of 14 adjacent cities. With 45 million square feet of industrial properties, the city has three times the amount of industrial properties than of its neighboring cities. It is one of the few remaining cities in Los Angeles to have land for development.

4. Incorporated in 1956, Santa Fe Springs was primarily an oil town. Over the years as the oil production wound down, developers began to convert these former fields into industrial buildings. Because of its central location to freeways, the port, airport and Orange County, along with highly functional new industrial buildings, companies have relocated and stayed in Santa Fe Springs. The current vacancy rate in Santa Fe Springs in 4.59 percent, even as construction has boomed with over 3.6 million square feet added to the base in the year 1999.

5. The City of Santa Fe Springs has had a successful record of redevelopment of former oil-field properties into industrial and office spaces. The City's continuing commitment to planned redevelopment of distressed land is evident in their successful application for a Superfund Redevelopment Pilot Grant. This grant will be used by the City to actively participate in the redevelopment planning for the Site.

6. The prospects for future industrial development in Santa Fe Springs are promising. Reasonably anticipated future use includes construction, redevelopment and renovation of industrial spaces. The following factors should continue to push lease and sale rates and lower vacancy in industrial buildings in the Santa Fe Springs area:
   - The lack of available land and buildings to meet demand.
   - The demand for new functional industrial space.
   - The increase in air and port traffic to Los Angeles.
   - The thriving southern California economy.
   - A city eager to help in the business development process. Santa Fe Springs has prepared both a Land Use Element Report and General Plan Land Use Map. The City has also prepared a Development Information, Regulations and Requirement Summary for use by potential developers.

7. There is not a current use of ground water at the Site, nor are there bodies of surface water on or near to the Site. There is not an anticipated use of ground water at the Site. The reasons for this are summarized below:

- Because of exceedances of MCLs in the ground water beneath the Site, and in the shallow ground water in the Site vicinity (see Section 2.1.1), restrictions on the construction and extraction of ground water wells are being proposed. Please see Section 5.1.2 for discussions on the specific restrictions.
- Ground water use rights are carefully regulated through the California Department of Water Resources. Ground water use in the Central Basin, where the Site is located, is restricted to the adjudicated rights by a Superior Court Judgment and monitored by a court-appointed Water Master. The level of control of the Water Master extends to water rights sales and leases for ground water use. With this level of control, it is anticipated that restrictions placed on ground water can be easily enforced.
- The Water Replenishment District of Southern California in their 1994 Annual Survey and Report on Groundwater Replenishment, stated, "...it should be recognized that the present groundwater management program does not include replenishing the lost [groundwater] supplies from the shallow aquifers. With present urban characteristics in mind, the return of historical water levels in these shallow aquifers could be more detrimental than beneficial. That is, extremely high ground water levels could adversely affect current urban development and construction." So it is clear that the District is not relying on the shallow aquifers in its overall water management planning.

2.1.2 SUMMARY OF HISTORICAL SITE ACTIVITIES

1. The reservoir was used for the storage of crude oil from the Santa Fe Springs field from 1924 to some undetermined time, probably in the 1930s. During this time frame various activities were being performed outside the reservoir, including the storage and mixing of drilling muds. Additionally the Site would be subjected to ponding of rainwater. It is not conclusive from aerial photograph review whether waste disposal activities were being systematically carried out during this timeframe. Beginning in the late 1940s to early 1950s, the Site was used for disposal of a range of wastes and solid fill materials.

2. An aerial photograph from 1945 shows that the reservoir contents had been removed and the area surrounding the reservoir had been scraped and was relatively free of staining. The photos from 1949, 1953 and 1958 show the reservoir as containing liquids (rainwater or perhaps oily liquid or sludge) and/or drilling muds. After 1949, activities were regulated under permit from Los Angeles County, Department of Sanitation until closure of the facility

in 1964. Reliable documentation on disposal was not maintained; as a result, a comprehensive history of Site disposal practices or accepted waste is not available. However, permitted waste included the following: rotary drilling muds; clean earth; rock; sand and gravel; paving fragments; concrete; brick; plaster; steel mill slag; dry mud cake from oil field sumps and acetylene sludge. Investigations have shown that disposed material also included, but is not limited to, organic waste, oil refinery waste, solvents and waste chemicals. Wastes were disposed within the reservoir boundary, and in bermed areas surrounding the reservoir, and throughout the Site.

3. In 1953, WDI began receiving fill material for covering the Site, including the reservoir area and unlined bermed disposal pits. Borehole data indicate that between 5 to 15 feet of fill exists over most of the Site. Recent investigations have shown the fill to be less than 1 foot thick in a 100-square-foot zone in Area 5 near the building at 9843 Greenleaf Avenue. The fill consists mostly of a silty sand material containing construction debris (e.g., broken concrete, gravel, asphalt, wood and brick) with low concentrations (e.g., below background levels) of various chemicals of concern (COCs).

4. Aerial photographs of the Site from 1922 to 1998 were reviewed. The following summarizes Site conditions were observed in the photographs:
   - 1920s: Site is undeveloped until 1924. The reservoir is constructed in the 1924 photo. Areas outside the reservoir showed evidence of use, probably the storage and mixing of drilling muds. There were also areas that contained standing water.
   - 1930s: In the late 1920s to early 1930s the reservoir was decommissioned from use as a crude oil storage facility. Areas outside the reservoir showed evidence of use, probably the storage and mixing of drilling muds. There were also areas that contained standing water. The reservoir cover was in place in 1937.
   - 1940s: A 1941 photograph shows that the reservoir cover had been removed. An aerial photograph from 1945 shows that the reservoir contents had been removed and the area surrounding the reservoir had been scraped and was relatively free of staining. Other areas of the Site appear to have disposal activities. In the late 1940s the Site was being used as a liquid and solid waste disposal facility.
   - 1950s: Disposal activities are continuing both inside and outside the reservoir and the reservoir is being covered with fill material. Street frontage property is being developed.
   - 1960s: By 1963, the reservoir is covered with fill and most disposal activities have ended. Site is continuing to be developed and is being used for light industrial purposes (i.e., similar to present conditions).

Copies of the aerial photographs are provided in Appendix C of this SFS Report.

5. The Site has been the subject of various investigative activities from the early 1970s through 1999. These activities have included the investigation of the physical and chemical characteristics of the soil, ground water, soil gas, liquids located within and outside the reservoir boundary and in-business air onsite.

6. During the time period from 1971 through 1987, the following relevant activities were completed at the Site for geotechnical and environmental assessment purposes:
   - 1971 Foundation Investigation, Proposed Industrial Building, 12707 East Los Nietos Road, Santa Fe Springs, California (Advanced Foundation Engineering, Inc.).
   - 1975 Fill Investigation and Preliminary Soils Study (Hammond Soils Engineering).
   - 1981 Foundation Investigation (Moore and Tabor).
   - 1984 Phase I, Summary of Findings, Preliminary Site Characterization (Dames & Moore).
   - 1985 Summary of Findings, Phase II Investigation (Dames & Moore).
   - 1986 Site Investigation, Toxo Spray Dust, Inc. (Dames & Moore).
   - 1986 Site Investigation, Campbell Property (Dames & Moore).
   - 1987 Soils Investigation (Hunter & Associates).
   - 1988 Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA).
   - 1995 Predesign and Intermediate (60%) Design Report, Soils and Subsurface Gas Remedial Design (WDIG)

7. EPA conducted RI/FS investigations in 1988 and 1989. These investigations consisted of:
   - Ambient air monitoring.
   - Soil borings.
   - Installation and monitoring of ground water wells.
   - Installation and monitoring of soil vapor wells.
   - Geophysical surveys.

   Also as part of RI/FS investigations quarterly ground water monitoring was conducted in 1992.

8. As part of the 1995 predesign activities, WDIG conducted the following investigations at the Site:

- Area 4 and 7 soil sampling.
- Vapor well monitoring.
- Ground water monitoring.
- Soil gas survey (surface soils).

9. Recent investigations (e.g., 1997 to 1999) were conducted by WDIG and EPA to collect, review and update additional data on ground water, soil, soil gas and liquids located within and outside the reservoir boundary. These investigations include the following:

- EPA Activities (1997 through 1998):
  - Subsurface Gas Contingency Plan:
    - Soil Gas Survey.
  - In-Business Air Monitoring.
  - Area 7 Geoprobe Investigation.
  - Reservoir Physical and Chemical Characterization.
  - Piezometer Study of the Reservoir Interior.
  - High Vacuum Extraction Study.
  - Ground Water Data Review and Recommendations.
- WDIG Activities (1997 through 1998):
  - 1997 Geoprobe Investigation.
  - Technical Memorandum (TM) No. 6 - Reservoir Liquids Recovery Test (Revision 1.0).
  - TM No. 7 - Vapor Well Construction.
  - TM No. 8 - Additional Reservoir Liquids Extraction Well and Vapor Well/Probe Sampling.
  - TM No. 9A - Soil Vapor Extraction Testing.
  - TM No. 10 - Additional Soil Sampling and Leachability Testing (Revision 2.0).
  - TM No. 11 - Reservoir Area Grading and Waste/Debris Management.
  - TM No. 12 - Additional Reservoir Liquids Recovery Testing and Piezometer Abandonment.
  - Phase II Reservoir Interior Test Trench Excavations.
  - Quarterly Ground Water, Soil Gas and In-Business Air Monitoring.
- WDIG Activities (1999):
  - TM No. 13 - Pilot-Scale Treatability Study for Reservoir Liquids Removal (Revision 1.0).
  - Quarterly ground water, soil gas and in-business air monitoring.

A complete description of the objectives and findings of these investigations are provided in the reports outlined in the RD Investigative Activities Summary Report (Rev. 1.0) (TRC, 1999f).

2.2 COMPREHENSIVE SUMMARY OF SITE ENVIRONMENTAL CONDITIONS

1. Based on the information presented in the RD Investigative Activities Summary Report, an overall understanding of the Site conditions has been developed and is shown in Figure 2.2. Media-specific summaries are shown in Tables 2.1 through 2.4. The figure and tables show that the Site can be divided into various zones, so different remedial alternatives can be evaluated in this SFS for each area based on specific local Site conditions. The following sections summarize the Site media conditions.

2.2.1 SUMMARY OF SOIL AND LIQUIDS CONDITIONS

1. Figure 2.3 provides a delineation of the boundary of the extent of the buried waste, as determined using EPA and WDIG data collected during field activities conducted between 1988 through 1998. The extent of the buried waste is greater than what was thought at the time of the 1989 ROD and the 1995 Predesign.

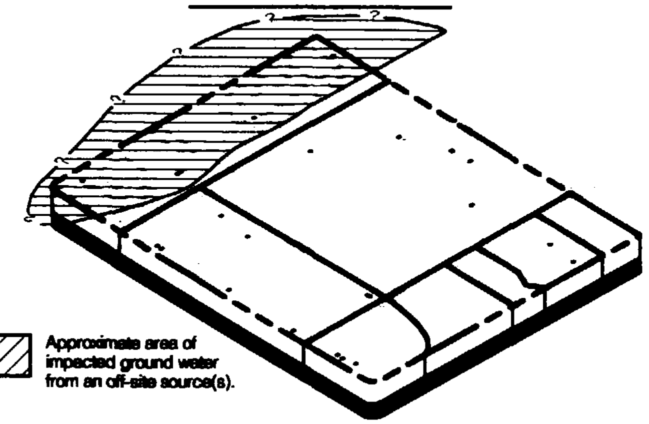
2. Table 2.1 provides a brief summary of the findings of the soil investigations completed at the Site between 1971 and 1998. The results of the chemical characterization of the fill soils, the buried waste and native soils indicate that wastes located outside the reservoir boundary are composed primarily of drilling muds mixed with minor amounts of debris and waste. Results of the 1997 WDI geoprobe chemical analyses indicate that these materials contain CERCLA hazardous constituents. However, the results of limited soils testing performed during TM No. 10 activities indicate that the chemicals in these do not exceed the established Toxicity Characteristic Leaching Procedure (TCLP) and Soluble Threshold Limit Concentration (STLC) criteria for hazardous waste delineation limits (TRC, 1999a). As previously discussed, some elevated levels of arsenic, beryllium, lead, zinc, and some volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) were observed in the fill material during the 1988 to 1989 Remedial Investigation (RI) activities, but have been found to be below hazardous levels by TCLP and STLC testing.

3. A cross section showing the Site lithology is shown in Figure 2.4. This figure provides an illustration of the subsurface soils of the Site.

4. The reservoir materials consist of approximately 5 to 15 feet of overlying fill soils. The fill soils typically consist of compacted, dry silty sand. Below depths of about 3 feet to 6 feet bgs the fill is frequently intermixed with broken concrete and construction debris.

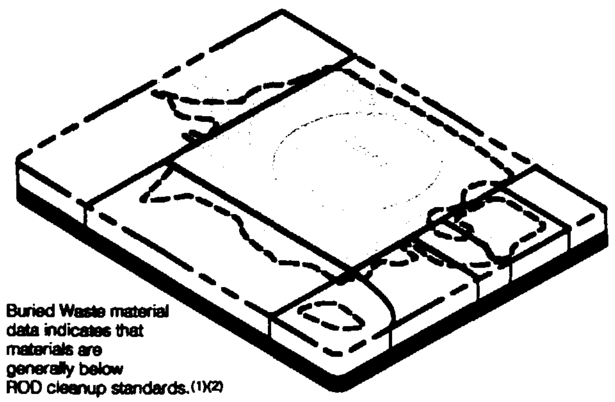
94-256RSFS-11 REV. 05/22/99

GROUND WATER



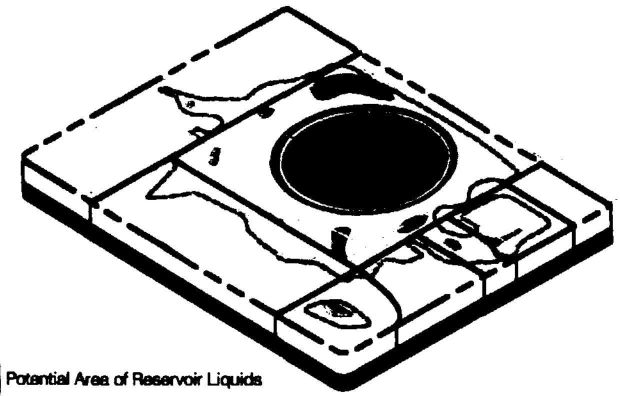
Approximate area of impacted ground water from an off-site source(s).

SOILS



Buried Waste material data indicates that materials are generally below ROD cleanup standards.(1)(2)

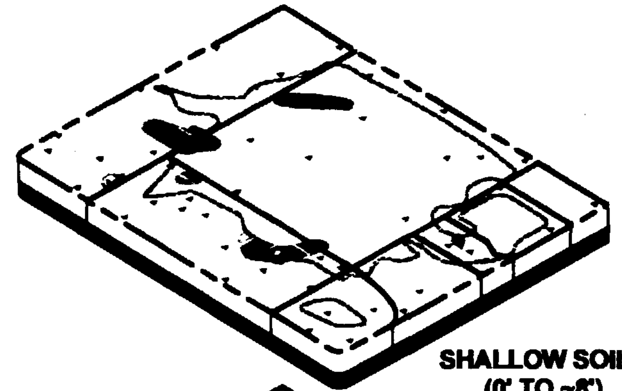
LIQUIDS/LEACHATE



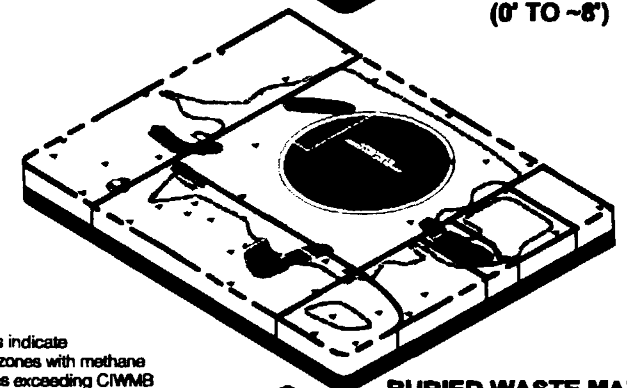
Potential Area of Reservoir Liquids

Potential Area of Liquids Outside Reservoir

SOIL GAS

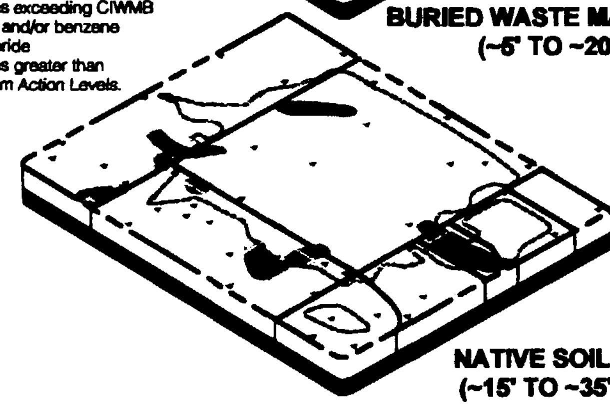


SHALLOW SOILS
(0' TO ~8')



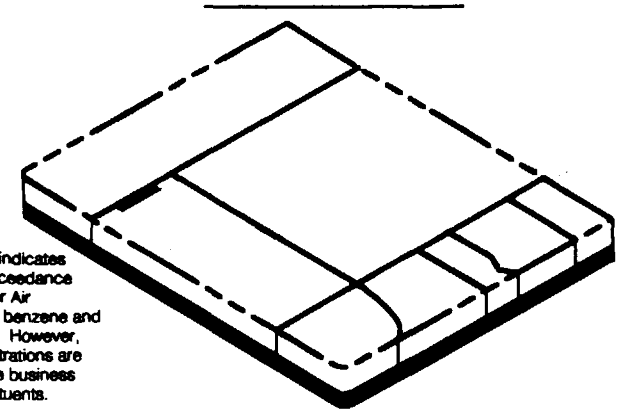
BURIED WASTE MATERIAL
(~5' TO ~20')

Shaded areas indicate approximate zones with methane concentrations exceeding CIWMB requirements and/or benzene and vinyl chloride concentrations greater than the EPA Interim Action Levels.



NATIVE SOILS
(~15' TO ~35')

IN-BUSINESS AIR



Shaded area indicates a potential exceedance of EPA In-door Air Standards for benzene and vinyl chloride. However, these concentrations are believed to be business related constituents.

LEGEND

VAPOR WELL

GROUND WATER WELL

NOTES

(1) Soil sampling indicated approximately 24 exceedances of the ROD cleanup standards for only the total metals constituents (i.e.: As, Be, Cr, Pb and Tl), out of 648 analyses performed on buried waste samples.

REV. 2.0
DRAFT

SITE MEDIA CONDITIONS

WASTE DISPOSAL, INC.
SANTE FE SPRINGS, CALIFORNIA

TRC

FIGURE 2.2

Approximately 10 to 17 feet of waste material underlies the fill soils. The reservoir waste material is composed of organic wastes, building debris, drilling muds, tank bottoms, refinery wastes, liquids, sludge and oily wastes. Chemical characterization of the reservoir materials has indicated the presence of elevated levels of the following types of constituents also indicated in Table 2.1:

- VOCs
  - Methane
  - Benzene, toluene, ethylene, xylene (BTEX)
  - Vinyl chloride
  - Chlorinated solvents
  - Aliphatic hydrocarbons
- Metals[3]
  - Arsenic
  - Beryllium
  - Lead
  - Zinc

5. Material outside the reservoir consists of overlying fill material varying from approximately 1 to 10 feet in thickness. The fill soils typically consist of compacted, dry silty sand. Below depths of about 3 feet to 6 feet bgs the fill is intermixed with broken concrete and construction debris. Drilling muds were also encountered outside the reservoir boundary. They ranged in thickness with thin layers being less than 3 feet and thick layers being as much as 35 feet. Waste material outside the reservoir is composed of organic wastes, building debris, drilling muds, tank bottoms, refinery wastes, liquids, sludge and oily wastes.

6. Liquids investigations performed by EPA and WDIG are summarized in Table 2.2. The results of the investigations indicate that the reservoir liquids/leachate contain CERCLA hazardous substances, including constituents at levels which may exceed Resource Conservation and Recovery Act (RCRA) hazardous criteria. The presence of potentially elevated polychlorinated biphenyl (PCB) concentration in some areas of the reservoir will be evaluated as part of TM No. 13. Additional data on the reservoir liquids/leachate will be obtained during the TM No. 13 Treatability Study, as discussed below. Figure 2.1 shows locations of all seven water supply wells, including the two closest to the Site.

---

(3) ROD Standards for beryllium are below background levels, but are above Industrial Primary Remediation Goals (PRGs). Arsenic levels at the Site are above PRGs, but are consistent with local background conditions. The ROD Standards for arsenic are below background levels. These determinations are documented in the ROD (EPA, 1993a) and 60% Design Report (TRC, 1995).

7. Analyses of two perched liquid samples collected outside the reservoir during the geoprobe investigation resulted in no detectable levels of VOCs. Figure 2.5 shows the location of the liquids both inside and outside the reservoir boundary. The liquids encountered outside the reservoir were observed during activities conducted during 1997 and 1998 field investigations by EPA and WDIG. In the EPA 1988 to 1989 RI Investigative Activities, their conclusions state: "It can be concluded that the reservoir is the most contaminated source containing high concentrations of metals and volatile organics. However, most of the contamination appears to be confined within the concrete-lined area. Although the concrete bottom may not to be intact in several areas, the contamination has not spread downward to ground water. Ground water under the Site is relatively free of contamination. Certain areas used previously as waste handling areas also contain elevated levels of contamination. These areas are not lined and therefore, waste presence and migration in the subsurface may be considered as a potential health hazard in these areas. However, for the most part, contamination in these areas appears to be bound to the soils and are relatively immobile. Subsurface gas presence in this area may also pose a health hazard and its remediation may be needed" (EBASCO, 1989c).

8. Currently, WDIG is conducting a treatability study for the removal of liquids from the reservoir (TM No. 13 - Pilot Scale Treatability Study for Reservoir Liquids Removal) (TRC, 1999b). The purpose of the study is to quantify the effectiveness of liquid removal and to collect additional liquids data. After approximately 48 weeks of operation, the liquids extraction system has recovered approximately 120,000 gallons of aqueous phase liquids and 615 gallons of oily liquids from the reservoir. Recent data has shown that pump rates and liquid level recovery have decreased significantly in the extraction wells. For example, extraction rates have decreased from approximately 120 gallons per hour (gph) to 2 gph since system startup.

2.2.2 SUMMARY OF SOIL GAS CONDITIONS

1. As indicated in Table 2.3, based on the results of the RI and the 1997 to 1998 EPA and WDIG investigations, soil gas concentrations exceeding EPAs proposed interim threshold levels for methane and VOCs have been detected within the reservoir and five other locations onsite. Figure 2.2 illustrates site media conditions, including soil gas. Figure 2.6 shows an aerial photo of the Site including vapor well locations. The satisfaction of state regulatory criteria for boundary areas and those near to most structures has been confirmed with the exception of the areas shown in Figure 2.7.

2. The data presented above indicate areas exceeding the California Integrated Waste Management Board (CIWMB) regulations for methane or the Provisional Soil Gas Standards established by EPA. Consistent exceedances of the Provisional Soil Gas Standards in two or more monitoring periods were considered in identifying these areas, including adjacent to several onsite buildings in Areas 5 and 8. Using the Provisional Soil Gas Standards for the Site boundary (see Figures 2.8 through 2.10), the following areas with verified exceedances have been identified:

   - Reservoir
   - Northwest corner of Area 2 (RV storage lot)
   - 12637B Los Nietos Road (Area 2)
   - 9843 Greenleaf Avenue (Area 5)
   - Northeast portion of Area 8
   - Area 8 near the auto storage yard
   - Southwest portion of Area 8
   - Central portion of Area 7

   The Provisional Soil Gas Standards and the COCs used for this evaluation are preliminary and may be revised when the final action levels and COCs are determined by EPA.

3. In-business air monitoring conducted by EPA in August 1997, and by WDIG since February 1998, has not demonstrated soil gas infiltration into the onsite businesses, as summarized in Table 2.3. EPAs Subsurface Gas Contingency Report (CDM Federal, 1999b) concluded that VOCs detected during monitoring may be due to the onsite business chemical inventories developed by EPA. WDIG has since completed several rounds of in-business air monitoring, which have confirmed EPAs initial conclusion that soil gas infiltration has not been observed.

4. Soil Vapor Extraction (SVE) treatability testing (TRC, 1999a) conducted in various Site locations has shown overall low levels of methane and VOCs. However, some elevated levels were observed in isolated wells before and after treatment of the area using SVE. SVE testing further showed that the volatile constituents could be removed by vapor extraction, and that the actual mass of soil gas constituents was relatively small. Based on the results of the SVE testing, methane generation rates were calculated, and found to be typically very low.

5. Reservoir vapor well testing indicated that the reservoir may contain high levels of methane and VOCs, as shown in EPAs high vacuum extraction testing. However, the high vacuum tests clearly indicate that the actual mass of methane and VOCs is limited, as evidenced by the dramatic drop in British thermal unit (BTU) levels during the first 24 hours (e.g., less than 2,500 parts per million [ppm] methane). Based on this data, the reservoir does not appear to

be generating large volumes of methane which is consistent with the gas generation calculations prepared in February 1998 and as discussed in Section 4.3 of the RD Investigation Activities Summary Report (Rev. 1.0) (TRC, 1999a).

6. Based on these results, soil gas at the boundaries of the waste zone appears to be isolated to a number of discrete areas of concern.

2.2.3 SUMMARY OF GROUND WATER CONDITIONS

1. Several Site COCs (VOCs and metals) have been detected above their respective maximum contaminant levels (MCLs) in the ground water samples. However, these exceedances do not appear to be related to Site wastes based on their distribution in ground water (e.g., some contaminants are detected upgradient or cross-gradient from Site waste sources, and some contaminants are detected in an intermediate ground water monitoring well but not in the adjacent shallow ground water monitoring well). The results of the ground water monitoring conducted at the Site sporadically since 1989 are summarized in Table 2.4.

2. Toluene has been detected sporadically by the EPA (maximum concentration was 64 micrograms per liter (µg/L)which is below its MCL [150 µg/L]) in ground water sampled adjacent to and downgradient of Site waste sources. WDIG has not detected toluene in the ground water since April 1998.

3. VOCs detected in ground water samples are primarily tetrachloroethylene (PCE) and trichloroethylene (TCE), with concentrations generally less than 20 µg/L. PCE and TCE concentrations in several locals are above their respective MCL of 5 µg/L for primary drinking water. These VOCs have been detected in the western portion of the Site in both upgradient and deep monitoring wells. Based on ground water flow conditions, the distribution of detection, and information on offsite ground water contamination sites, the sources of PCE and TCE detected in the western portion of the Site appear to be from solvent releases associated with upgradient industrial sites. However, similar constituents have been identified in soil gas, soils and onsite liquids. Therefore, some contribution from the Site cannot be ruled out, although this is unlikely given the physical characteristics of the reservoir materials and the concrete lining.

4. CDM Federal concludes in their Ground Water Data Evaluation Report (CDM Federal, 1999a) that significant impact on ground water has not been identified from the Site based on

available sampling results and the location and characteristics of the waste sources. WDIG concurs with this conclusion since data collected by WDIG from September 1997 through October 1998 is consistent with data collected by CDM Federal.

5. The Site is situated in a heavily industrialized area and the production of oil from Santa Fe Springs Oil Field has been ongoing since the early 1900s. Upgradient and cross-gradient of the Site are several properties that have had confirmed solvent (PCE and TCE) releases. The sites located upgradient have documented ground water contamination at much higher concentrations than for the VOCs detected in ground water at the Site. Associated Plating Company, located 0.2 mile northwest of the Site (Site 15 in Table 2.5), is listed in the Toxic Release Inventory System (TRIS) as having released a significant amount of PCE. For these reasons, it is most likely that the PCE and TCE detected in ground water monitoring wells in the western portion of the Site (GW-01, -10, -11, -22, -23 and -24) are related to solvent releases associated with the upgradient industrial sites.

6. A Site Assessment Report was acquired from VISTA Information Solutions, Inc. (VISTA) including information on sites within a 1.25-mile radius of WDI. Sites included in this report were compiled from federal and state lists (e.g., NPL, state equivalent priority list, Comprehensive Environmental Response, Compensation and Liability Information System [CERCLIS], etc.); RCRA corrective actions; permitted treatment, storage and disposal facilities; registered small and large generators of hazardous waste; violations and enforcement actions; registered aboveground and underground storage tanks; leaking underground storage tank lists; Toxic Release Inventory database; and Emergency Response Notification System (ERNS) and state spills lists.

7. The VISTA report identified a total of 150 sites within 1.25 miles of the Site that are included on various agency lists and inventories. After reviewing information provided by these agencies, a final list was compiled of sites with VOC contamination in ground water, sites at where an underground storage tank (UST) was leaking a VOC, or an unknown substance; and those that reported spills of a VOC or unknown substance. These sites are listed in Table 2.6 and their locations are shown in Figure 2.11.

8. The sites listed in Table 2.6 were then reviewed in more detail to determine which property owners had been required by agencies to install ground water monitoring wells. Nine sites listed in Table 2.6 were found to have had ground water monitoring wells installed on the

properties. Table 2.6 provides a summary of the maximum contaminates identified in these monitoring wells. As indicated in Table 2.6 elevated levels of PCE and TCE were identified in wells at eight of nine sites in the WDI area.

9. Ground water investigations at three sites located to the northwest of WDI indicated concentrations of VOCs in ground water in excess of federal and state MCLs. Ground water samples collected during February 1994 at the McKesson Corporation site, located at 9005 Sorenson Avenue and south of the Southern Pacific Railroad easement, was found to contain PCE, TCE, 1,1,1-trichloroethane (TCA) and 1,1-dichloroethene (DCE) at maximum concentrations of 15,000 µg/L; 14,300 µg/L; 114,000 µg/L and 11,800 µg/l, respectively. Ground water beneath the Diversey Wyandotte Corporation (located on Burke Street, due north of McKesson) was also found to contain the same VOCs, but at much reduced concentrations. PCE was detected at a maximum of 210 µg/L in ground water from the Diversey Wyandotte Corporation. 1,1,1-TCA and 1,1-DCE were also detected at concentrations above their MCLs (7 µg/L and 200 µg/L, respectively) at both sites (see Table 2.9).

10. Six other sites are located south (downgradient) of the Site. Ground water beneath the Ashland Chemical site, located south of Telegraph Road on Painter Avenue, contained PCE and TCE at maximum concentrations of 9,300 µg/L and 11,000 µg/L, respectively, during October 1995 sampling. The majority of these sites are located within, or adjacent to, the Santa Fe Springs Oil Field and ground water beneath them has been impacted by petroleum hydrocarbons and VOCs.

2.3 OVERVIEW OF SITE CONDITIONS

2.3.1 THE RESERVOIR AND SURROUNDING AREAS

1. In the center of Area 2 of the Site is a 42-million-gallon reservoir that was constructed in the 1920s to store crude petroleum. The bottom of the earthen, concrete-lined reservoir appears to have been built several feet below the original ground surface elevation. When constructed, the reservoir was approximately 600 feet in diameter. By the mid- to late-1930s, the reservoir was not used to store crude oil. Instead, the reservoir was used as a disposal area for both liquid and solid wastes. Because of waste disposal and layers of fill soil that have been added as cover, the bottom of the reservoir is an estimated 22 feet below the present ground surface. Aerial photographs indicate that the area surrounding the reservoir probably was used for disposal activities as early as the 1920s. Disposal activities in and around the reservoir

continued into the late-1950s. The operators of the Site subdivided areas around the reservoir into "cells" for disposal of liquid and solid wastes, much of which contained hazardous substances. The operators used a "dike and fill method" in which wet drilling muds were deposited in "lagoons" outside of the reservoir to dry out. Once the drilling muds or waste liquids had dried, the operators added a new layer of wet drilling muds or other waste materials on top of the previous layer. This method of construction was designed to contain the wastes, although at various times during the operation it appears these dikes or berms may have been breached and released liquids beyond the containment structure. Once the disposal operations were discontinued in the late-1950s, these surrounding disposal areas, as well as the reservoir were covered with 5 to 8 feet of soil. Some of these fill soils contain low amounts of metals, pesticides and PCBs.

2. The 1989 RI Report concluded that a variety of waste materials had been disposed in the reservoir. The recent 1997 to 1999 investigative studies more fully characterized the type and extent of these buried wastes. The wastes are primarily a mixture of construction debris, drilling muds, industrial sludges and wastes, solvents, oily wastes and fill soil. These materials are unevenly distributed throughout the reservoir. In general, from 0 to 8 feet bgs the reservoir contains fill material typically consisting of relatively low permeability, compacted silty sand. Below depths of approximately 3 feet to 6 feet bgs the fill frequently contains a small volume of construction debris, such as concrete, bricks, wood and asphalt. Below the fill material to approximately 20 to 24 feet, there is a mixture of drilling muds, waste sludges and some construction debris (e.g., concrete). During the 1989 RI, EPA installed 108 soil borings to a depth of at least 35 feet to characterize contamination at the Site. EPA then collected waste samples both within and outside the reservoir. In 1995, the WDIG drilled an additional 28 borings to further characterize buried waste in areas adjacent to Greenleaf Avenue. In 1997, EPA and WDIG undertook additional studies of the entire 40-acre Site as part of the RD investigation. More than 350 soil borings were drilled to determine how deep and how wide an area contained buried waste (see EPA Fact Sheet Figure 7). These investigations confirmed that the buried wastes outside of the reservoir contained petroleum-related chemicals, solvents, sludges, drilling muds and construction debris. That is, disposal areas surrounding the reservoir contain waste materials with chemical and physical characteristics similar to buried wastes in the reservoir. The latest round of sampling conducted by WDIG and EPA determined that most of the interior, central portion of the Site outside the reservoir also contains buried waste and hydrocarbon-stained soils ranging in thickness from an average of 5 to 10 feet to a maximum of 18 to 20 feet.

3. Figure 2.1 delineates the area where subsurface investigative soil borings have identified buried waste. In addition, recent research and studies indicate that buried waste extends up to or underneath portions of three onsite buildings on Los Nietos Road and Greenleaf Avenue. Aerial photographs from the 1930s, 1940s and 1950s more clearly identify historical disposal pits or lagoons in areas outside the reservoir (see EPA Fact Sheet Figures 4a, 4b and 4c). The wastes in these areas are covered with fill material, thereby preventing an immediate waste contact threat.

4. During July 1998, EPA conducted an investigation to determine more clearly the location and types of liquids within the reservoir. EPA installed 60 temporary piezometers, or probes, using a grid pattern at 50-foot intervals. Liquids were detected during this investigation in the buried waste materials and soils at many locations, as well as, in soil borings installed during earlier investigative studies.

5. As discussed in EPAs May 1999 Fact Sheet, the location of liquids within the reservoir varies. Parts of the reservoir contain little or no liquid, while other locations contain watery or oily waste. For the most part, pockets of liquids do not appear to be connected. These liquids appear to be dispersed at random elevations throughout the reservoir. Liquids collected from the reservoir were sent to a laboratory for analysis. The liquids contained hazardous substances, including benzene, TCE, PCE and PCBs. While the investigation confirmed, liquids are present in the reservoir, the volume of liquids could not be determined. To attempt to better estimate the volume and feasibility of removing liquids, WDIG currently is conducting a removal treatability study which has recovered over 100,000 gallons of liquids.

6. Liquids also were detected in some areas outside the reservoir. Liquids appear to be located on top of the buried waste material. TM No. 13 - Addendum 3 includes an evaluation of the findings of liquids in areas outside the reservoir (TRC, 1999b).

7. During the winter of 1998, WDIG installed subsurface drains near several onsite buildings to control drainage during storm conditions. Also, interim measures were undertaken in 1997 and again in 1998 to manage comprehensively surface water runoff from the Site.

8. As part of additional studies conducted at the Site, extensive soil gas monitoring has been conducted. The results of EPAs and WDIGs soil gas monitoring have indicated the following Site conditions:

- Elevated soil gas levels of methane and VOCs adjacent to buildings in Areas 5 and 8.
- Elevated levels of vinyl chloride, PCE and TCE have only been detected in reservoir liquids.
- Five areas of the Site have been identified, which exceed interim threshold levels for soil gas, i.e., Areas 1, 2, 5, 7 and 8).

TABLE 2.1

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR SOIL MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 RI INVESTIGATIVE ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Soil	AFE, 1971 • Preliminary Foundation Investigation (12707 East Los Nietos Road): - 0 to 3 feet: clayey silt (fill material). - 3 to 15 feet: silty clay with fine sand. - 15 to 20 feet: sand. HSE, 1975 • Fill Investigation and Preliminary Soils Study (12707 East Los Nietos Road): - 0 to 7.5 feet: Mottled sandy silt and clay (fill material) (North). - 0 to 8.5 feet: Mottled sandy silt and clay (fill material) (Center). - 0 to 1.5 feet: Mottled sandy silt and clay (fill material) (South). - 7.5 to 10 feet: Clay silt to silty clay. Moore & Tabor, 1981 • Foundation investigation (northeast corner of Los Nietos Road and Greenleaf Avenue): - 0 to 5 feet: Silty sand to sandy silt intermixed with trash and debris (fill material). - 5 to 15 feet: Debris mixed with bentonite (sump material). - 5 to 16 feet: Silty sand and clayey and sandy silt (alluvial deposits). Dames & Moore, 1984 • Site investigation for soil conditions: - 0 to 9 feet: fill material. - 9 to 23.5 feet: clay with silt and sand. - STLC exceedances of barium, cadmium, copper, lead, mercury, nickel, silver, vanadium and zinc were observed in soil samples collected from four borings.	• One hundred eight (108) soil borings were drilled to 35 feet at specified locations around the site: - Buried Reservoir: • 0 to 15 feet: Artificial fill (soil and debris). Varied from 5 to 15 feet thick across reservoir. • Drilling muds and crude extend beyond to bottom of reservoir (18 to 23 feet total depth). - Area 1: • 0 to 5 feet: Fill material and asphalt (thin near border). • 5 to 20 feet: Interbedded clays with silt and sand. • Waste is encountered at depths varying from 10 to 25 feet bgs along the eastern boundary of area. - Area 2: • Fill material: - Eastern side: 0 to 10 feet - Northeast corner: 10 to 15 feet - Southern border: 0 to 10 feet • Waste material: - Northwest corner: Maximum depth 20 to 25 feet. Intermixed with sludge and free liquids at depth of 7 to 10 feet bgs. - Northeast corner: Ranges from 5 to 20 feet bgs. Brown clay layer between 15 to 20 feet. - Southwest corner: 10 to 20 feet bgs. - Northern portion of reservoir the waste materials are not extensive. • Seven borings were drilled through berm. Clay layers underlain by sand were encountered.	• Area 4: - Sixteen (16) shallow borings and six deep hollow-stem auger borings: • Material types: - Fill material - Sump material - Native soil - Five (5) to 15 feet of fill material consisting of silty sand with miscellaneous construction debris. - Sump material consisting of sand and silt and saturated with oily substances. Located in central portion of area. Greatest depth was 35 feet bgs. - Native material silt or poorly graded sand with silt. - Thallium and beryllium were COCs which exceeded ROD standards. • Area 7: - Thirteen (13) shallow borings and one (1) deep hollow-stem auger borings: • Encounter similar materials as Area 4. • Chromium and arsenic exceedances in the sump material. • Thallium and beryllium exceedances with ROD standards.	Area 7 Geoprobe Characterization: • Fill material appears to be underlain by a natural, undisturbed, fine, well-sorted sand or, in some places, possibly a silt. • Areas of stained soil containing oily liquids. • Extent of soil staining is on the order of 200,000 cubic feet (ft^3). • Volume of soil containing liquids is approximately 50,000 ft^3. Reservoir Physical Characteristics: • Geophysical Survey (Dipole-Dipole Resistivity and Terrain Conductivity): - Dipole-Dipole Resistivity and Terrain Conductivity: • Anomaly 1 represents the reservoir edge and dry berm material. • Anomaly 2 includes most of the remaining material, both inside and outside of the reservoir. • Anomaly 3 includes a small area of high resistivity values, close to the surface and outside of the reservoir. Spectrum, the ERT contractor that performed the geophysical survey, attributes the anomaly to high resistivity hydrocarbon sludge or hydrocarbon saturated soils.	Geoprobe Investigation: • Volume of waste material inside the central reservoir is calculated to be approximately 148,000 cubic yards (yd^3). Volume of sump-like material outside the reservoir is calculated to be approximately 211,000 yd^3. Soil chemistry data include the following: • Area Inside the Reservoir: - Most constituents for the waste materials are below cleanup standards. Exceptions are one exceedance of arsenic and chromium and PCE at 12-foot depths. - Constituents for the overlying fill material generally are less than the cleanup criteria. The concentrations of arsenic and chromium at a depth of 3.8 feet are slightly above the cleanup standards. • Area Outside the Reservoir: - Sump-like material was observed at most of Area 2, along the inside perimeters of Areas 1, 6 and 8, and within the interior perimeters of Areas 4, 5 and 7. - The thickness of sump-like material is approximately 3- to 12-foot. Some thicker zones exist in Areas 4 and 5. - Soil Chemistry Data Results • Overlying Fill - Concentrations of organic constituents are below PRGs, at all locations. - Concentrations of metals are generally below PRGs, with the exception of: • One occurrence of arsenic, chromium and lead.

TABLE 2.1

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR SOIL MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 RI INVESTIGATIVE ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Soil (Continued)	Dames & Moore, 1985 • Phase II Remedial Investigation: - Thirty-five (35) soil samples from WDI site, St. Paul's High School athletic field and vacant lot: • Loose sand, fine gravel fragments, concrete and plant matter in subsurface samples. • STLC exceedance of lead in five samples. However, similar to background concentrations. • Barium, copper and vanadium below STLC. • No detectable concentrations of priority pollutants in surface samples. • Logs for MWs: - MW-1: • 0 to 2 feet: fill material. • 2 to 14 feet: black oily sludge (sump material). • 14 to 22 feet sand and clay with trace of silt. • 22 to 40 feet fine- to medium-grained sand. • 40 to 75 feet: sand and clayey silt. - MW-2: • 0 to 25 feet: Silty clay. • 25 to 77 feet: Sand and gravel with silty clayey and clayey silt layer intermixed (33 to 52 feet). - MW-3: • 0 to 9 feet: Fill material. • 9 to 23 feet: Clayey silt to silty clay. • 23 to 74 feet: Sand intermixed with silty clay (33 to 38 feet). Dames & Moore, 1986d (Toxo Spray Dust, Inc.) • Site investigation: - Soil samples indicated DDT and other pesticides. Dames & Moore, 1986a (Campbell Property [Area 7]) • Soil physical characteristics: - Levels of naphthalene, di-n-butyl phthalate, 2-methyl-naphthalene, fluorene, phenanthrene, ethyl benzene were detected at various depths. - pH ranged from 7.9 to 8.4. - Metals below TTLC and STLC. - CPT soundings showed soft sump-like materials extending 100' x 175' x 10'. - Greatest depths of sump-material was 18 feet.	- Area 3: • No soil borings. - Area 4: • Four borings within the area: - 5 to 10 feet of fill material. - Waste material encountered below fill material extending 20 feet bgs. - Clay layer with sand 21 to 25 feet. - Border of Area: • 0 to 5 feet: Fill material. - 5 to 10 feet of fill material. - 5 to 10 feet: Stiff clay. - 10 to 25 feet: Silt, clay and sand. No contamination. • Rectangular shape of waste area. - Area 5: • 0 to 5 feet: Fill material. • 5 to 20 feet: Silty clay to clay. • 20 to 35 feet: Sand. • No visible contamination. - Area 6: • 0 to 5 feet: Fill material. • 5 to 20 feet: Gray clay with some silt. • 20 to 35 feet: Native clay layer. • No visible contamination. - Area 7: • Within the area: - 0 to 5 feet: Fill material. - 5 to 20 feet: Waste material. - >20 feet: Native fine- to medium-grained sand with no visible contamination. • Border of Area: - 0 to 5 feet: Fill material. - 5 to 20 feet: Native silty, clay layer. - >20 feet: Fine- to medium-grained sand. - Area 8: • Northern portion of area: - 0 to 5 feet: Fill material. - 7 to 10 feet: Waste material. - 10 to 50 feet: Clay. - New site perimeter. - 0 to 20 feet: Clay. - >20 feet: Clay silt and sand. - No visible contamination.		- Terrain Conductivity Results: • Terrain conductivity surveys provide two types of measurements. The in-phase results were successful in generally locating the berm and edges of the reservoir. The diameter of the reservoir as determined by the geophysical methods is about 25 feet less than determined from maps and drawings of the site. In some portions of the circular anomaly marking the general edge of the reservoir, the data contour lines are less dense. These may be areas where the berm has been breached or is partially missing. • Contents (Physical) Characterization: - The reservoir fill material includes silt, drilling mud, concrete, brick and wood. • Structural Characteristics: - Reservoir Measurements: • The reservoir's concrete liner varies from 3 inches to 4 inches in thickness and has a 1/4-inch reinforcement wire mesh through the middle of the liner. The liner walls slope toward the center at an angle of 27 degrees as measured in the field. • The reservoir concrete liner has been measured by geophysical methods to be 575 feet in diameter, but was probably at least originally 600 feet in diameter before the top of the cement wall was broken down several feet for filling and surface grading. During intrusive activities, a berm width of 40 feet was measured at a depth of 6 feet. The measured thickness of the clay berm is approximately 22 feet. The berm is composed of fine, reddish-brown clay.	• Sump-Like Materials - Concentrations of organic constituents are below PRGs, at all locations. - Concentrations of metals are generally below PRGs, with the exception of arsenic, chromium and lead. • Underlying Soils - Concentrations of metals and organics below PRGs for practically all underlying soil samples. The one exception is an occurrence of arsenic at 20 percent above the PRG at a depth of 18 feet. TM No. 10 - Additional Soil Sampling and Leachability Testing: • Based on the total VOC data, the following conclusions can be made: - Fill Samples: • VOCs would be below TCLP and MCL limits. - Waste Samples: • VOCs would be below TCLP limits. - Waste Samples: • VOCs would be below TCLP limits for all the constituents with the exception of VC in one sample. This sample had a high detection limit (1 to 2 milligrams per kilogram [mg/kg]) for VC; however, the result does not necessarily mean that VC is present. • One exceedance of the STLC for lead was observed. The sample contained 5.07 mg/L lead compared to the STLC limit of 5.0 mg/L. • Deionized leaching results confirmed that the potential for leaching under rain infiltration conditions is very low, and below the TCLP acid extraction levels. • Based on the information presented above, the materials tested appear to be classified as nonhazardous for disposal purposes.

TABLE 2.1

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR SOIL MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 RI INVESTIGATIVE ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Soils (Continued)	John L. Hunter & Associates, 1987 • Campbell property (Area 7) investigation following unauthorized discharge of plating solutions. • Metal concentrations below TTLC, with the exception of one exceedance of nickel. • STLC exceedances of chromium, nickel, copper, zinc, arsenic, cadmium and lead. • Nitrate: 9 to 3,990 ppm. • pH: 5.6 to 7.9.	- Area 1 had exceedances of the PRGs for arsenic, benzo(a)pyrene, beryllium and lead. - Area 2 had exceedances of the PRGs for PCBs, arsenic, benzene, benzo(a)pyrene, beryllium, chrysene, lead, tetrachlorethene, vinyl chloride, and xylenes (total). - Area 3 had exceedance of PRG for arsenic. - Area 4 had exceedances of the PRGs for anthracene, arsenic, benzene, beryllium, chrysene, and zinc. - Area 5 had exceedance of PRG for arsenic. - Area 6 had exceedance of PRG for arsenic. - Area 7 had exceedance of the PRGs for PCBs, arsenic, benzo(a)pyrene and bis(2-ethylhexyl)phthalate. - Area 8 had exceedance of the PRGs for arsenic, beryllium and lead. - Baseball field had exceedance of PRG for arsenic.		• The current depth of the reservoir is believed to be approximately 14 feet below ground surface (bgs) on the eastern side and 12 feet bgs on the western side, relative to the existing ground surface. - Reservoir Observations: • At the 12:00 o'clock location, the concrete wall was found to be missing to an unknown depth. The excavated material contained a considerable amount of very large rocks and concrete blocks. The clayey berm (mixed of red and gray clay) surrounding the outer boundary of the reservoir was compromised, revealing a heterogeneous material, and dark staining to 7 feet beyond (away from) the reservoir wall. • At the 1:00 o'clock location, the concrete wall was cleanly cut (vertically). An apparent "makeshift" wall of large rocks and concrete debris was set back away from the reservoir, approximately 2 feet from where the existing evidence of dark staining 7 feet beyond the concrete wall toward the St. Paul School's athletic field, to a depth of approximately 8 feet. • At the 3:00 o'clock location, the reservoir wall was encountered at approximately 6 feet bgs, and revealed several vertical and horizontal fractures. Piezometer Study: • Waste material consists of fill soil (silt), construction debris (cement, bricks, wood, muds and oily-wastes).	TM Nos. 6, 8 and 12 Reservoir Liquids Testing: • Silty sand to sandy silt 9 to 10 feet thick. • Waste material is approximately 5 to 10 feet thick below the fill material.

94-256/Rpts/SFS (7/14/00/rm)

TRC
Customer-Focused Solutions

TABLE 2.2

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR LIQUIDS LOCATED WITHIN AND OUTSIDE THE RESERVOIR BOUNDARY WASTE DISPOSAL, INC. SUPERFUND SITE

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 EPA RI ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Liquids located within and outside the reservoir boundary.	AFE, 1971 • N/A HSE, 1975 • N/A Moore & Tabor, 1981 • N/A Dames & Moore, 1984 • N/A Dames & Moore, 1985 • MW-2 was originally abandoned at 15 feet. Waste material and free liquids were encountered at the original location. Dames & Moore, 1986d (Toxo Spray Dust, Inc.) • N/A Dames & Moore, 1986a (Campbell Property [Area 7]) • N/A John L. Hunter & Assoc., 1987 • N/A	Thirty-seven borings were drilled in areas where contaminated liquids were suspected of being deposited in unlined sumps: • Area 2 free liquids were observed 7 to 10 feet bgs.		Area 7 Geoprobe Characterization • Liquid volume is approximately 18,700 gallons. • Approximately 1,900 gallons may be recoverable. Reservoir Physical Characterization: • Contents (Physical) Characterization: - Piezometers depict the distribution of the liquids within the reservoir, however the phase (nonaqueous/aqueous) thickness data should be taken as an estimate of true thickness. - Liquid levels were encountered at varying depths ranging from 4 to 12.5 feet bgs. Piezometer Study: • The following observations and conclusions were made by CDM Federal based on the information collected during the investigation: - Fifty-two (52) of the 60 boreholes exhibited liquids in the soil cores. - Over time (24 hours) all of the probes exhibited liquids. - Liquid levels ranged from surface to approximately 6 to 8 feet bgs. • In some locations the liquids appear to be perched on top of the waste materials, and at other locations the liquids appear to extend near to the bottom of the reservoir. The distribution of liquids appears to reflect the manner in which wastes were disposed of in the reservoir. Waste disposal occurred over several years, apparently in batches of varying materials. Some of the materials appear to be drilling muds, whereas other materials appear to be construction debris. Some materials appeared to contain oil. The observed liquid levels are not indicative of the actual level found within the reservoir nor the volume of liquids. The results of this investigation indicated that liquids are probably associated with thin seams and discrete zones of limited permeability within the wastes. Although perched liquids were encountered at some locations, liquids were observed throughout the waste mass.	Chemistry of Perched Water Observations: • Perched water was sampled and analyzed for VOCs at TS-137 and -141. Additional analysis were not performed due to a limited volume of samples collected. Analyses of the water from these locations do not show detectable concentrations of VOCs. • In October 1997, VW-09 was sampled for liquids and pumped to determine the recharge potential. Sampling of VW-09 liquids indicated the following constituents: - VOCs • Benzene, ethylbenzene, toluene, 4-methyl-2-pentanone and vinyl chloride at low levels. - SVOCs • Naphthalene and 2-methyl-naphthalene. - PCBs • Low levels of PCBs were detected, e.g., <0.5 ppm. - Metals • Low levels of Arsenic, Barium, Cadmium, Chromium, Lead and Nickel were detected. Pump testing indicated the well recharged to within 80 percent of the original level within 24 hours. • Liquid levels were monitored in the reservoir from November 1997 to February 1998. During this period, liquid levels rose significantly because of unprecedented rainfall caused by the global weather pattern known as "El Niño." There is an anomalous drop in water level at Well P-1, the reason is not apparent. • The results of the initial TM No. 6 activities indicated the liquids extracted during the pump test were being yielded by the overlying fill soils and not the underlying, relatively impermeable waste material. Fluid conductivity testing indicated conduction in the fill on the order of 10^{-7}. Although the fluid conductivity appears low in comparison to the TM No. 6 results, it appears that the majority of the flow comes from between the fill and sump layers. Additional activities consisted of two pump tests to help verify this hypothesis. • Liquids recovery tests were also performed as outlined in TM No. 12. The tests consisted of purging sixty-two 1-inch piezometers installed by EPA, noted above, and monitoring the recovery rates of the liquids. The data collected during the TM No. 12 recovery testing was used for the following: - Characterize the recharge rates of the reservoir liquids. - Determine the presence and recovery rates of liquids, as well as free product. - Determine if liquid levels return to static/background levels.

N/A - Findings are not applicable to media.

TABLE 2.2

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR LIQUIDS LOCATED WITHIN AND OUTSIDE THE RESERVOIR BOUNDARY WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 EPA RI ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Liquids located within and outside the reservoir boundary. (Continued)				• The principal conclusions drawn from this pilot test are as follows: - The objective of developing EX-1 as a free flowing well was not achieved; however, the test did demonstrate that fluid could be drawn into the well under vacuum and that it would return to the formation when the vacuum was released. This confirms the screen and gravel pack were not impeding flow. - The sustained rate of liquid extraction achieved from extraction well EX-2 averaged 4.93 gallons/hr during the first 5 days and 2.42 gallon/hr during the next 11 days. This compares to a yield of 3 gallon/hr as obtained by the WDIG using a 24-hour short-term cycle pumping test. Considering that the reservoir contains a fixed volume of fluid and the limited zone of influence, the yield is expected to decrease as liquid is removed by each test. Applying the vacuum appears to enhance the rate of liquid recovery and may increase the total volume recovered from a given well. - The influence of the vacuum on liquid levels in the surrounding monitoring wells and piezometers displayed anisotropic conditions with no consistent correlation of drawdown versus distance. - This technology is not cost-effective for recovering energy or liquids from the reservoir. The poor performance is because of the limited rate at which methane is generated and the low permeability of the material.	• Observations and analytical data collected during trenching and TM Nos. 6, 8 and 12 activities showed the following characteristics of the materials encountered within the reservoir: - Reservoir liquids consist of infiltrated rainwater and light crude oil. - Fill material consists of an extremely heterogeneous silty sand to sandy silt layer intermixed with wood and concrete debris. - Waste material consists of black stained clays (drilling muds) with zones of liquid and/or product. - Hydraulic characteristics of liquids within reservoir boundary are extremely heterogeneous. Areas of higher permeability lenses which contain liquids were observed in both the fill and sump material. - Chemical characteristics of liquids do not indicate the liquids are a hazardous material. • Observations made during trenching and additional TM No. 6 and 12 activities support the hypothesis that liquids within the fill and sump material are contained within higher permeability lenses. These pockets are not interconnected and locations are not well defined throughout the reservoir. • A total of 22 wells were installed by WDIG to demonstrate whether the liquids in the reservoir could be effectively extracted by pumping activities. The data generated from these wells indicated the following: - Three of the six extraction wells were dry (EX-1, -3 and -5). This is possibly because of the undefined areas of higher permeable lenses. - Liquid levels appear to be related to the diameter of the wells. The levels are influenced by: (1) low permeability of the fill and waste material; (2) limited volume of liquids; and (3) differences in void space determined by the diameter of the boring. - Low hydraulic yields of the material. Sustainable short-term yields ranged from 0.001 gpm to 0.050 gpm. The yields would be expected to decrease over time because of the limited zone of influence and volume of free-liquids contained in the higher permeability lenses. - Limited radius of influence ranging from less than 5 feet to approximately 20 feet during WDIG activities. However, during the ERT vacuum enhanced testing, an influence was observed >20 feet from the extraction well.

94-256/RPTS/SFS (7/14/00/rm)

N/A - Findings are not applicable to media.

TRC Customer-Focused Solutions

TABLE 2.3

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR SOIL GAS AND IN-BUSINESS AIR MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 RI INVESTIGATIVE ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Soil Gas and In-Business Air	AFE, 1971 • N/A HSE, 1975 • N/A Moore & Tabor, 1981 • N/A Dames & Moore, 1984 • N/A Dames & Moore, 1985 • N/A Dames & Moore, 1986d (Toxo Spray Dust, Inc.) • Methane results of 23.1 percent (231,000 ppm) and 597 ppm of total nonmethane hydrocarbon as hexane were observed from one sample. Dames & Moore, 1986a (Campbell Property [Area 7]) • Gas samples indicated methane concentrations ranging from 9,500 ppm to 11,200 ppm. Total nonmethane hydrocarbon as hexane was detected in one well at 29 ppm. • Samples were collected from three shallow probes (5 to 6 feet). John L. Hunter & Assoc., 1987 • N/A	• A subsurface gas investigation was performed by converting 26 soil borings into subsurface gas monitoring wells. A total of 28 subsurface gas samples were analyzed for basic gases and trace contaminants: - Results indicate that there are large variations in the trace organic gases distributed across the site and to some extent the ratio of major gases identified as well. The presence of chloroform, trichloroethane, trichloroethene, tetrachloroethene, benzene, methane, trichloroethene and perchloroethene were detected. - Analytical results also identified the presence of vinyl chloride ranging from 73 to 110 ppbv adjacent to and within the reservoir about 180 feet west of the reservoir. - The detection frequency of these gases range from approximately 4 percent to 100 percent. - Tetrachloroethene is the most prevalent organic gas present in the subsurface media at the WDI site. - Trichloroethene has the highest average concentration among the detected compounds and vinyl chlorine shows the highest concentration of the compounds but it was detected in only three wells.	• Soil gas measurements were performed in the available site vapor wells in June 1995: - Results of the screening and analysis indicate generally low levels of methane (e.g., generally less than 5 percent) and low concentrations of VOCs (e.g., generally less than 1 ppm). The results are summarized by site area below: - Area 2 - Soil gas concentrations ranging from 0.3 to 9.34 percent methane with VOCs ranging from nondetect to less than 1.4 ppm. Subsurface gas measurements conducted during the RI indicated concentrations ranging from 0.0 to 39.18 percent methane with VOCs ranging from 0.003 to 16 ppm. - Area 4 - Soil gas concentrations of 0.0 percent methane and VOCs were not detected. - Area 7 - Soil gas concentrations ranging from 0.0 percent to a single well with 18.5 percent methane and VOCs ranging from nondetect to less than 1 ppm concentrations. - Other Site Areas - Soil gas concentrations ranging from 0.0 to 4.0 percent methane and VOCs ranging from nondetect to 5.2 ppm.	Chemical Characterization of the Reservoir: • The results of the reservoir chemical characterization indicated the following conditions: - Elevated levels of the following VOCs were observed in the vapor phase: • Benzene • Toluene • Xylene • Ethylbenzene - Elevated methane levels in the southwest quadrant of the reservoir. - Low levels of chlorinated solvent, degradation products and vinyl chloride in some areas of the reservoir. - Benzene detected in all samples but piezometer P-3. Toluene, Ethylbenzene and Xylene were detected in all samples. High Vacuum Extraction: • The principal conclusions drawn from this pilot test are as follows: - The yield of combustible vapors was substantially less than the fuel requirement of the engine. The highest yield over a 24-hour period was 50,415 BTU/hr compared to a fuel demand of 360,000 BTU/hr. Also, there were extended periods with no measurable fuel being extracted. The rate of biologically produced methane from this site is substantially less than the unit consumes. - This technology is not cost effective for recovering energy or liquids from the reservoir. The poor performance is because of the limited rate at which methane is generated and the low permeability of the material.	TM No. 6, 8 and 12 Additional Reservoir Liquids Investigation: • VOCs detected from EX-2 include vinyl chloride, Bz, TCE, toluene, and xylene. Annual Soil Gas Monitoring Results: • As part of the Soil Gas Monitoring program, WDIG and EPA have installed an additional 37 multilevel probes at the site. • Annual Soil Gas Monitoring has indicated elevated level of VOCs and methane in the following areas, in excess of the ITSLs: - Northwest Corner of Area 2 (RV lot) - Adjacent to C & E Die (Area 2) - Brother Machine Shop (Area 5) - Northeastern Portion of Area 8 - Area 8 near the auto storage yard • The primary VOCs in excess of the ITSLs include: - Methane - Benzene - Vinyl chloride - TCE Other VOCs have been detected as discussed in the RD Investigative Activities Summary Report but are below correct action levels. • The data demonstrate that at the perimeter, and near most structures methane levels are below the CIWMB standard of 5 percent. - Methane levels adjacent to Brother Machine Shop and C & E Die are above the 1.25 percent level. Annual In-Business Air Monitoring Results • WDIG has completed over seven rounds of In-Business Monitoring at six onsite businesses. • In-business monitoring has shown no evidence of soil gas migration into onsite business, which is consistent with EPA conclusions presented in Report Subsurface Gas Contingency Plan. • Constituents identified in in-business air samples are consistent with business activities which include the use of solvent and petroleum fuels. TM No. 9A - Soil Gas Testing • WDIG completed a Treatability Study in five site areas to evaluate SVE. These areas included: - Brother Machine Shop (Area 5) - Area 7 (near VW-25) - C & E Die (Area 2) - Area 8 - RV Lot (Area 2) • The treatability results indicated the following: - SVE zone of influence ranged from 30 to up to 50 in the fill soils, and 120 to 200 feet on the deep zone. - The constituents extracted were primarily methane, benzene, vinyl chlorine, TCE and PCE. • Posttreatment monitoring of the SVE areas indicated some rebound in methane levels in localized hot spots such as in Area 5 and C & E Die (Area 2).

N/A - Findings are not applicable to media.

TABLE 2.3

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR SOIL GAS AND IN-BUSINESS AIR MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 RI INVESTIGATIVE ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Soil Gas and In-Business Air (Continued)		• It can be concluded that the WDI reservoir is the most contaminated source containing high concentrations of metals and volatile organics. However, most of the contamination appears to be confined within the concrete-lined area. Although the concrete bottom may not to be intact in several areas, the contamination has not spread downward to ground water. Ground water under WDI is relatively free of contamination. Certain areas used previously as waste handling areas also contain elevated levels of contamination. These areas are not lined and therefore, waste presence and migration in the subsurface may be considered as a potential health hazard in these areas. However, for the most part, soil contamination in these areas appear to be bound to the soils and are relatively immobile. Subsurface gas presence in this area may also pose a health hazard and its remediation may be needed.		Soil Gas: • A comparison of the ITSLs with soil gas concentrations for VOCs and methane show that ITSLs have been exceeded at several locations at the site. VOCs were detected above soil gas ITSLs in ten wells and 11 temporary probes. Methane was above the 5 percent ITSL in five vapor wells and 26 probes. • Benzene (Bz) was the VOC most frequently reported above its soil gas ITSL (nine probes/seven wells), followed by VC (five probes/nine wells), chloroform (two probes/two wells), tetrachloroethene (PCE) (two probes, one well), and 1,2-dibromoethane (one probe/two wells). VC and Bz were the only VOCs detected above ITSLs in the vapor wells in both the September 1997 and August 1998 sampling events. The site boundary ITSL for PCE of 190 parts per billion per volume (ppbv) was exceeded at gas probe GP-31 (PCE = 532 ppbv). This is the only location ITSLs were exceeded along the site boundaries. • To determine whether methane or VOCs from soil gas have migrated into the buildings onsite, in-business air samples were collected inside the 24 occupied structures on the site. Methane was not detected above 50 parts per million (ppm) (0.005 percent) inside the buildings. More than 25 VOCs were detected above background concentrations in the in-business air samples. Bz was the chemical detected above ITSLs most frequently. The presence of Bz, toluene and xylene may be because of the use of petroleum products such as gasoline or motor oil by the businesses onsite. Many of the businesses at the site repair automobiles and store gas cans within the buildings. The presence of trichloroethene (TCE), PCE and VC in the buildings may be because of the use of solvents and manufacturing processes. VC was detected once at the building at 12635 Los Nietos Road (Stansell Brothers). VC was not detected in the duplicate sample at this location.	• Overall observations: Low gas generation rate was observed consistent with the known site conditions and soil vapor monitoring activities: - SVE was found to be effective in reducing soil gas levels. - Very low levels of soil gases were extracted from the fill soils. - In deep soils, SVE reduced the soil gas levels significantly and created a large zone of influence. - Soil gas rebound was consistent with previous gas generation calculations.

TABLE 2.3

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR SOIL GAS AND IN-BUSINESS AIR MEDIA WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 RI INVESTIGATIVE ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Soil Gas and In-Business Air (Continued)				• Based on the partial well network established by the WDIG, EPA determined that ten building locations met the requirement for permanent monitoring points between the buried waste and the building. Four vapor well monitoring locations (VW-55, -57, -58 and -61) exceeded soil gas ITSL criteria for at least one COC. None of the other VOCs detected exceeded threshold levels. Soil Gas: • A comparison of the ITSLs with soil gas concentrations for VOCs and methane show that ITSLs have been exceeded at several locations at the site. VOCs were detected above soil gas ITSLs in ten wells and 11 temporary probes. Methane was above the 5 percent ITSL in five vapor wells and 26 probes. • Benzene (Bz) was the VOC most frequently reported above its soil gas ITSL (nine probes/seven wells), followed by VC (five probes/nine wells), chloroform (two probes/two wells), tetrachloroethene (PCE) (two probes, one well), and 1,2-dibromoethane (one probe/two wells). VC and Bz were the VOCs detected above ITSLs in the vapor wells in both the September 1997 and August 1998 sampling events. The site boundary ITSL for PCE of 190 parts per billion per volume (ppbv) was exceeded at gas probe GP-31 (PCE = 532 ppbv). This is the only location ITSLs were exceeded along the site boundaries. • To determine whether methane or VOCs from soil gas have migrated into the buildings onsite, in-business air samples were collected inside the 24 occupied structures on the site. Methane was not detected above 50 parts per million (ppm) (0.005 percent) inside the buildings. More than 25 VOCs were detected above background concentrations in the in-business air samples. Bz was the chemical detected above ITSLs most frequently. The presence of Bz, toluene and xylene may be because of the use of petroleum products such as gasoline or motor oil by the businesses onsite. Many of the businesses at the site repair automobiles and store gas cans within the buildings. The presence of trichloroethene (TCE), PCE, and VC in the buildings may be because of the use of solvents and manufacturing processes. VC was detected once at the building at 12635 Los Nietos Road (Stansell Brothers). VC was not detected in the duplicate sample at this location. • Based on the partial well network established by the WDIG, EPA determined that ten building locations met the requirement for permanent monitoring points between the buried waste and the building. Four vapor well monitoring locations (VW-55, -57, -58 and -61) exceeded soil gas ITSL criteria for at least one COC. None of the other VOCs detected exceeded threshold levels.	

94-256/RPTS/SFS (Rev. 2.0) (7/21/00/rm)

TABLE 2.4

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR GROUND WATER MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 EPA RI ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Ground Water	AFE, 1971 • N/A HSE, 1975 • N/A Moore & Tabor, 1981 • N/A Dames & Moore, 1984 • N/A Dames & Moore, 1985 • Encountered ground water at 52.5 feet, 80.5 feet and 50.5 feet. • Water samples did not contain detectable concentrations of either CAM metals or EPA priority pollutants. • MW-3 contains 12 ppb of chlordane, which exceeded the DHS level for drinking water (0.55 ppb). Dames & Moore, 1986d (Toxo Spray Dust, Inc.) • N/A Dames & Moore, 1986a (Campbell Property [Area 7]) • N/A John L. Hunter & Assoc., 1987 • N/A	• Twenty seven (27) of the soil borings were converted into ground water monitoring wells to determine the extent of ground water contamination. • In general, ground water has been encountered at a depth of 46 to 65 feet bgs. Accordingly, ground water is approximately 34 to 44 feet below the bottom of the WDI reservoir and 22 to 47 feet below the bottom of the WDI waste handling areas. • Ground water elevation indicates that ground water flow is generally in a southwest direction. According to the data, near the Campbell property (Area 7) and the Dia-Log property, the flow is slightly to the south and west. • Samples of ground water were collected from GW-01 and GW-02, both wells are installed upgradient of the WDI reservoir. Aluminum and selenium were found in both of these wells in concentrations above the Safe Drinking Water Act (SDWA) and Primary Maximum Contaminant Level (PMCL), standards. Concentrations of iron and manganese in these wells also exceed the Secondary Maximum Contaminant Levels (SMCL). Chromium was detected in concentrations above the MCL standard in GW-01. Arsenic, barium, copper, lead and zinc were found in both upgradient wells but at concentrations lower than the MCL standards. Calcium, magnesium, potassium and sodium were also found in both wells. Concentrations of cobalt, nickel, and vanadium were also detected. Volatile organics, semivolatile organics and pesticides/PCB compounds were not detected in these upgradient wells.	• The data indicates an average increase in elevation of 12.68 feet over the period of October 1988 to June 1995, with the highest changes occurring between late 1991 to the present. • The results of the September 1995 sample round indicated that the rising ground water elevation trend has been slowed significantly, as is excepted given the WRD activities. Based on this investigation, it does not appear that the ground level conditions will cause site conditions to impact ground water conditions.	• The following conclusions were based on the results and evaluation of ground water, waste source characterization and monitoring completed at WDI during the period October 1988 through April 1998 by CDM Federal: - 1997 water level monitoring indicates ground water occurs at depths ranging from 30 to 48 feet bgs (approximately 22 feet below the base elevation of the buried concrete reservoir). The upper water-bearing zone (estimated to be 100 feet or greater in thickness) consists primarily of interbedded and interconnected sandy alluvial deposits without laterally extensive confining beds. The overall direction of ground water flow is towards the south-southeast with a very low horizontal hydraulic gradient (average 0.004 feet/foot). - The WDI site contains a variety of liquid and solid wastes, many of which are hazardous substances, including petroleum and petroleum-related chemicals, solvents, acetylene sludge, drilling muds and construction debris (WDI wastes). WDI wastes occur both within and outside of the buried concrete reservoir that was originally used for petroleum storage. Outside of the reservoir, WDI wastes were disposed in unlined excavated sumps and waste pits. Soil boring investigations have confirmed that the interval of buried sump wastes occurs over areas outside of the concrete reservoir (depths generally between 5 and 25 feet bgs).	• Several site COCs (VOCs and metals) have been detected above their respective MCLs in the ground water samples. However, these exceedances do not appear to be related to site wastes based on their distribution in ground water (e.g., some contaminants are detected upgradient or cross-gradient from WDI waste sources). • VOCs detected in ground water samples are primarily PCE and TCE, with concentrations generally less than 20 µg/L. PCE and TCE concentrations in several locations are above their respective MCL of 5 µg/L for primary drinking water. These VOCs have been detected in the western part of the site in both upgradient and deep monitoring wells. Based on ground water flow conditions, the distributions of detection, and information for offsite ground water contamination sites, the sources of PCE and TCE detected in the western portion of the site appears to be from solvent releases associated with upgradient industrial sites. • Toluene has been detected sporadically by EPA (maximum concentration was 64 µg/L which is below its MCL [150 µg/L]) in ground water sampled adjacent to and downgradient of WDI waste sources. WDIG has not detected toluene in the ground water since February 1998. • CDM Federal concludes in their Ground Water Data Evaluation Report that significant impact on ground water has not been identified from the WDI site, based on available sampling results and the location and characteristics of the waste sources at the site. WDIG generally concurs with this conclusion since data collected by WDIG from September 1997 through October 1998 are consistent with those of CDM Federal.

N/A - Findings are not applicable to media.

TABLE 2.4

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR GROUND WATER MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 EPA RI ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Ground Water (Continued)		• Numerous metals were detected in samples collected from ground water monitoring wells located within the WDI site boundaries. The following discussion summarizes the significance of these results: - Aluminum was detected in 25 of 27 ground water monitoring wells. Twenty-three (23) wells show aluminum concentrations above the MCL of 1,000 ppb established by the SDWA. Aluminum was also detected in the upgradient wells. - Arsenic, barium, copper, lead, mercury, silver and zinc were found in more than one well but at concentrations below the MCLs. - Calcium was found in all wells. Concentration of calcium ranges from 187 to 354 ppm. The highest concentration was found in GW-01 which is an upgradient well. - Chromium was detected in 19 wells but GW-01 which is an upgradient well and GW-27 located near the southern end of the site contain concentrations above the MCL standard. - Cobalt was found in wells GW-01 (49 ppb), GW-09 (21 ppb) and GW-23 (16 ppb). - Iron was detected in 26 wells. Concentration of iron exceeds the MCL standard in 24 of these wells. The range of iron concentration is from 221 to 79,300 ppb. The highest iron concentration was found in GW-01, an upgradient well. - Magnesium was found in all wells. Concentration of magnesium ranges from 59 to 114 ppm. Magnesium was detected in both upgradient and downgradient from the site. - Nickel was found in 11 wells. The nickel concentration ranges from 24 ppb to 79 ppb. The highest concentration was found in GW-01, an upgradient well.		- The primary contaminants at WDI which have the potential to cause ground water impact include the wastes buried within the concrete reservoir, the buried waste materials disposed outside of the reservoir, and the soil gas. Hazardous constituents detected in WDI waste include Bz, toluene, ethylbenzene, and xylene (BTEX); solvents, primarily TCE, PCE and associated degradation products (e.g., VC); semivolatile organic compounds (SVOCs); heavy metals (arsenic, chromium, copper, lead), and PCBs. Elevated levels of soil gas are present in the subsurface (vadose zone) outside of the reservoir in many areas of the site. Soil gas hot spots are characterized by elevated levels of BTEX, CH_4, petroleum hydrocarbon vapor and chlorinated VOCs. - No significant impacts from WDI wastes on ground water quality have been identified based on the available ground water sampling results and the comparison of sampling results with the location and characteristics of the waste sources at the site. Several site COCs (VOCs and metals) have been detected above their respective State drinking water maximum contaminant levels (MCLs) in ground water samples. However, these exceedances do not appear to be related to site wastes based on their distribution in ground water (e.g., some contaminants are detected upgradient or laterally away from WDI waste sources). - The primary VOCs detected in ground water samples are TCE and PCE, generally at concentrations less than 10 micrograms per liter (μg/L). During 1997 to 1998 sampling, PCE was detected at five monitoring wells at concentrations above its MCL of 5 μg/L (maximum 77 μg/L, well GW-11). TCE was detected in ground water above its MCL of 5 μg/L during 1998 sampling at one monitoring well (GW-11, 7.6 μg/L). PCE and TCE have been detected in the western part of the site in both upgradient and deep monitoring wells. Based on ground water flow conditions, the distribution of detections and information on offsite ground water contamination sites, the source of the PCE and TCE detected in the monitoring wells in the western portion of the WDI site appears to be from solvent releases associated with upgradient chemical or industrial sites.	

N/A - Findings are not applicable to media.

TABLE 2.4

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR GROUND WATER MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 EPA RI ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Ground Water (Continued)		- Concentrations of manganese were detected at all wells including the two upgradient wells, GW-01 and GW-02. Concentrations above the MCL standard were found in 24 wells. Manganese concentrations ranged from 20 to 5,850 ppb. The highest concentrations of manganese were found in GW-13, -14, -15 and -21 with concentrations between 4,010 to 5,850 ppb. The first three of those wells are located downgradient of the reservoir. - Potassium was detected in all wells. The concentration of potassium ranges from 5,240 to 18,400 ppb. The highest concentration was detected at GW-01, an upgradient well. - Concentrations of selenium were detected in 26 wells. Twenty-five (25) wells had concentrations above the MCL. The highest concentration of selenium was detected in GW-01, an upgradient well. - Sodium was detected in all wells. Sodium concentration ranges from 102 to 190 ppm. The average sodium concentration for the two upgradient wells is approximately 140 ppm. - Vanadium was detected in ten monitoring wells. The highest concentration of vanadium was found in GW-01, an upgradient well. • Five volatile organic compounds were detected in WDI ground water. However, the concentrations of the contaminants are much lower than SDWA MCLs and DHS action levels. Trichloroethene is the VOC found in a concentration (18 ppb) above the MCL standard (5 ppb) in well GW-26. Acetone, a common laboratory contaminant, was found in GW-30. Concentrations of toluene (1-5 ppb) were detected in nine wells. Tetrachloroethene was found in GW-11 and -21. Chloroform was found in GW-06 and -07.		- Toluene has been detected sporadically in ground water sampled at monitoring wells adjacent to and downgradient of WDI sources (maximum concentration 64 µg/L which is below the MCL for toluene). Toluene is considered a useful indicator chemical for ground water monitoring based on the solubility characteristics of this compound and the fact that it is also present in WDI buried waste and soil gas. - There appears to be no light nonaqueous phase liquid (LNAPL) or dense nonaqueous phase liquid (DNAPL) sources contributing to ground water contamination beneath the site since high concentrations (e.g., greater than 1,000 µg/L) of dissolved solvents or BTEX and evidence of oily sheen or floating hydrocarbons have not been observed in the ground water sampling conducted at the WDI site. - Ground water sampling at the WDI site has not shown a consistent distribution or detection of the primary metals (arsenic, chromium, copper, lead) which are present at elevated concentrations in WDI wastes. The concentrations of these metals are generally very low and only isolated sampling rounds have exceeded the MCLs. Evidence of migration or impact to ground water from metals in WDI waste has not been observed in the ground water sampling data. - Elevated concentrations of aluminum, iron, manganese and selenium have been detected in ground water samples, in local cases, above primary or secondary drinking water standards. The fact that these metals are detected uniformly across the site (locally at higher concentrations in upgradient wells) suggests that the elevated concentrations reflect a regional water quality condition and are not related to WDI onsite sources.	

N/A - Findings are not applicable to media.

TRC Customer-Focused Solutions

TABLE 2.4

SUMMARY OF FINDINGS FOR SITE INVESTIGATIONS FROM 1971 TO 1998 FOR GROUND WATER MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

SITE MEDIA	1971 TO 1987 INVESTIGATIVE ACTIVITIES	1988 TO 1989 EPA RI ACTIVITIES	1995 WDIG PREDESIGN	1997 TO 1998 EPA RD INVESTIGATIVE ACTIVITIES	1997 TO 1998 WDIG RD INVESTIGATIVE ACTIVITIES
Ground Water (Continued)		• Four semivolatile organic compounds were detected in WDI ground water. Bis (2-chloroethyl) ether was detected at four well locations. The concentration of this compound ranged from 260 ppb to 690 ppb. A concentration of 36 ppb diethylphthalate was detected in GW-05. Concentrations of Di-n-butylphthalate (2 ppb) were found in GW-07 and GW-31. A concentration of 9 ppb of Di-n-octylphthalate was detected at GW-07. The three phthalate compounds are common lab contaminants. • Pesticides and PCB compounds were not present in detectable concentrations in WDI ground water samples.			

94-256/RPTS/SFS (Rev. 2.0) (7/21/00)(rm)

NA - Findings are not applicable to media.

(((

TABLE 2.5

CHEMICAL RELEASE SITES IN VICINITY OF WDI
SANTA FE SPRINGS, CALIFORNIA

SITE ID (Fig. 2-10)	SITE NAME	ADDRESS (Santa Fe Springs)	DISTANCE FROM WDI (miles)	DIRECTION FROM WDI	NATURE OF RELEASE
1	Foss Plating Co. Inc.	8140 Secura Way	1.1	N	TCE release - 11,200 lbs.
2	Santa Fe Enameling Metal Finishing	8427 Secura Way	0.8	N	TCE release - 13,1000 lbs.
3	Catellus Development Corp.	12140 Slauson Avenue	0.8	N	Leaking UST or VOCs
4	Cal-Tron Plating Inc.	11919 Rivera Road	1.0	N	TCE release - 15,800 lbs.
5	Techni Braze, Inc.	11845 Burke Street	0.9	NW	Leaking UST of VOCs (CERCLIS site)
6	Parker Hanninfin Corp.	11808 Burke Street	1.0	NW	TCE release - 13,000 lbs.
7	Aerospace Rivet Mfg. Corp.	8535 Dice Road	1.0	NW	Unknown chemical release (CERCLIS site)
8	West Bent Bolt	8623 Dice Road	1.0	NW	Unknown chemical release (CERCLIS site)
9	Witco Corporation	8733 S. Dice Road	0.9	NW	Many chemical spills - unknown, ethylene oxide, diethanolamine
10	Southern California Chemical	8851 Dice Road	0.8	NW	Many chemical spills - unknown, copper chloride, HCI
11	Diversey Wyandottle Corp.	8921 Dice Road	0.8	NW	Many corrective actions - "Stabilization Measures Evalution", CERCLIS
12	Mobil INSP Service Inc.	9110 S. Dice Road	0.7	NW	60 gal. benzene release to storm drain
12	T-Chem Products	9028 S. Dice Road	0.7	NW	Unknown chemical release - 1,377 lbs.
13	Witco Corp., Oleo/Surfactants Group	12143 Altamar Place	0.5	NW	Unknown chemical release - 500 lbs.
14	Valvoline Oil Co.	9520 S. John Street	0.4	NW	Unknown chemical release - 300 lbs.
15	Associated Plating Co.	9636 Ann Street	0.2	NW	PCE release - 14,5000 lbs.
16	Calavar Corporation	9200 Sorensen Avenue	0.5	NW	Leaking UST of VOCs
17	McKesson Chemical Corporation	9005 Sorensen Avenue	0.6	NW	Leaking tank of unknown substance
17	Peterson/Puritan Inc.	9101 S. Sorensen	0.5	NW	Leaking solvents tank
18	Rifkin Realty Partners	9300 Santa Fe Springs Road	0.4	N	Leaking tank of unknown substance
18	Salz Leather	9215 Santa Fe Springs Road	0.4	N	Leaking tank of unknown substance
18	PFI, Inc.	9215 Santa Fe Springs Road	0.4	N	Xylene release - 1,500 lbs.
19	UNK Vehicle	8922 S. Nogal	0.8	N	Unknown chemical release
20	Nadar's Cleaners	13401-13473 E. Telegraph Road	0.8	SE	Leaking tank of VOCs
21	Ashland Chemical	10505 S. Painter Avenue	0.7	S	Leaking solvents tank
22	Yozya Development Shoemaker Industrial Park	10600 Shoemaker Avenue	0.7	S	Soil contaminated with crude oil former Mobil Oil Co. property
23	McGranahan, Carlson and Co. Commerce Center II	Florence & Shoemaker Avenue	0.8	S	Site has been, and in some places continues to be, an oil production field (as of 1991)
24	PMC Specialties Group	10051 S. Romadel	0.42	SW	Leaking solvents tank

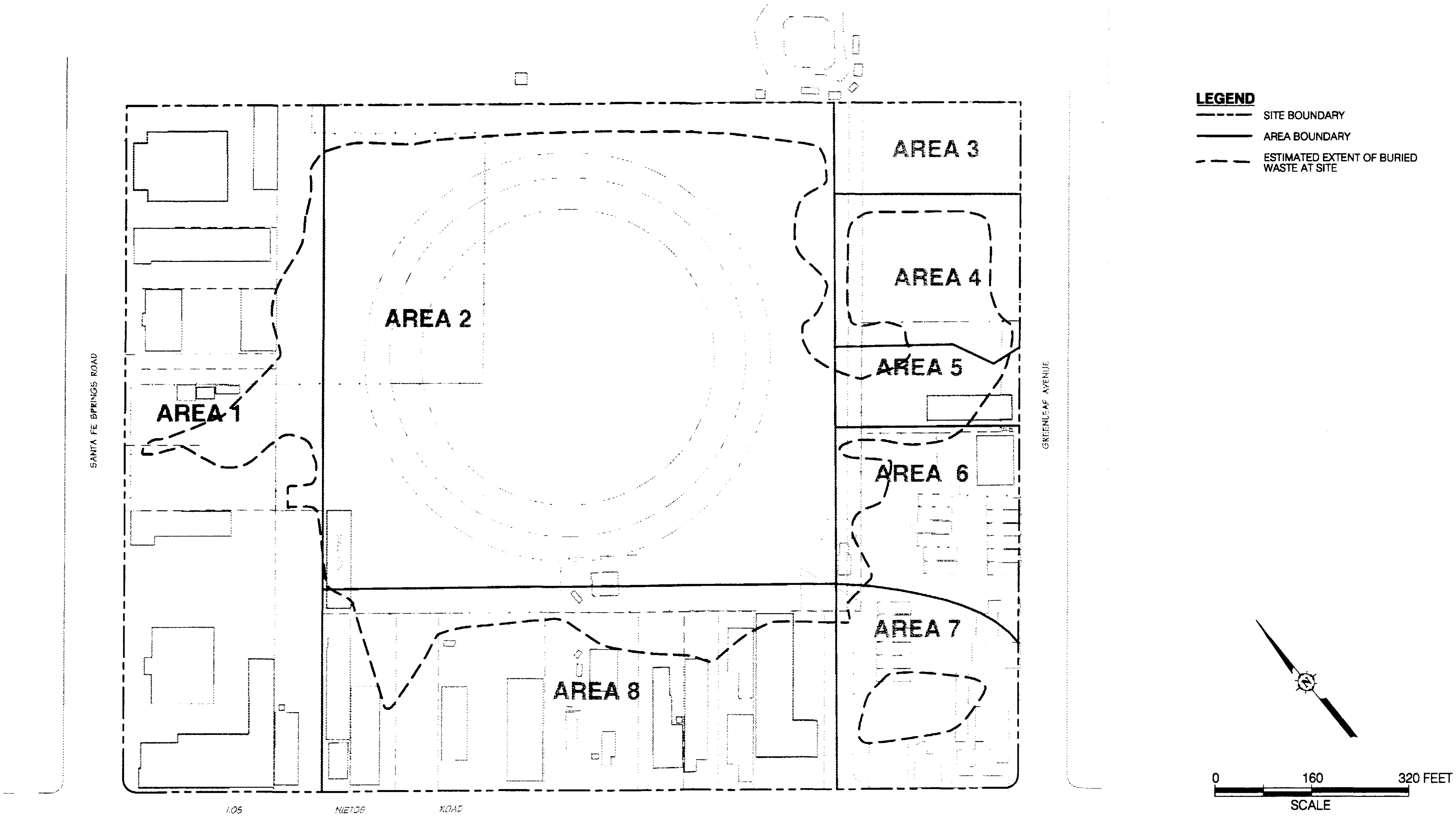
94-256/Rpts/SFS (7/14/00/rm)

TABLE 2.6

GROUND WATER MONITORING SITES IN VICINITY OF WDI
SANTA FE SPRINGS, CALIFORNIA

SITE ID (Fig. 2-11)	GROUND WATER INVESTIGATION SITE		UPGRADIENT (U) CROSS GRADIENT (C) DOWN-GRADIENT (D) FROM WDI	DISTANCE FROM WDI (miles)	SUMMARY OF GROUND WATER SAMPLING RESULTS				REMARKS/SITE FEATURES	REFERENCES
	Property Name and Address (Santa Fe Springs)	Number of Ground Water Wells			Sampling Date	Analyses Conducted	Maximum Concentration of Selected Parameter ($\mu g/L$)			
A	Techni-Braze, Inc. 11845 Burke Street	4 monitoring wells	U	1.0	1991	VOCs	PCE TCE 1,1,1-TCA 1,1-DCE	7,400 100 17 28	Alloy brazing and heat treatment of metals facility	Kleinfelder, 1991
B	Diversey Wyandotte Corp. 8921 Dice Road	4 monitoring wells 4 extraction wells	U	0.8	1997	VOCs, PAHs	PCE TCE 1,1,1-TCA 1,1-DCE	38 210 64 590	Kerosene product on ground water	Environmental Strategies, 1997
C	McKesson Corp./Angeles Site 9005 Sorensen Avenue	23 monitoring wells	U	0.7	1994	VOCs	PCE TCE 1,1,1-TCA Meth. Chloride 1,1-DCE	15,000 14,300 114,000 48,700 11,800	Leaking UST/VOC release site	Geomatrix Consultants, 1995
D	Calavar Corp. 9200 Sorensen Avenue	not available	U	0.5	1997	VOCs	not available		RWQCB determines site is not source of VOCs found in ground water (no further action required)	RWQCB Letter, 3/18/97
E	Oil Fields Reclamation Project	27 monitoring wells	D	0.6	1995	VOCs, TPH	TPH Benzene PCE TCE	110,000 2,200 830 300		various
F	PMC Specialties/Ferro Corp. 10051 S. Romandel	4 monitoring wells	D	0.4	1986	Cresylic acid etc. TPH	TPH	120,000	Site manufactured cresylic acid and naptheic acid	Kleinfelder, 1986
G	Nadar Cleaners 13401-13473 E. Telegraph Road	8 monitoring wells	C	0.8	1997	VOCs	PCE TCE	39 3.2		SECOR, 1997
H	Ashland Chemical 10505 S. Painter Avenue	33 monitoring wells	D	0.7	1995	VOCs	PCE TCE	9,300 11,000	Leaking UST/VOC release site	Ground water Technology, Inc., 1996
I	Yozya Development Shoemaker Industries Park 10600 Shoemaker Avenue	6 monitoring wells	D	0.7	1988	VOCs	PCE TCE 1,1-DCE	120 370 1,600	Upgradient Ashland site suspected source of VOCs in ground water	Maness Environmental, 1989
J	MC&C Commerce Center Florence & Shoemaker	4 monitoring wells	D	0.8	1991	VOCs, SVOCs	TCE 1,2-DCE total	21 130	Upgradient Ashland site suspected source of VOCs in ground water	McLaren Hart, 1991

94-256/Rpts/SFS(Rev. 2.0)(7/24/00/jb)



REFERENCE: ESTIMATED EXTENT OF BURIED WASTE PROVIDED BY, CDM FEDERAL PROGRAMS CORPORATION, 11/29/99.

REV. 2.0
DRAFT

ESTIMATED EXTENT OF BURIED WASTE AT SITE

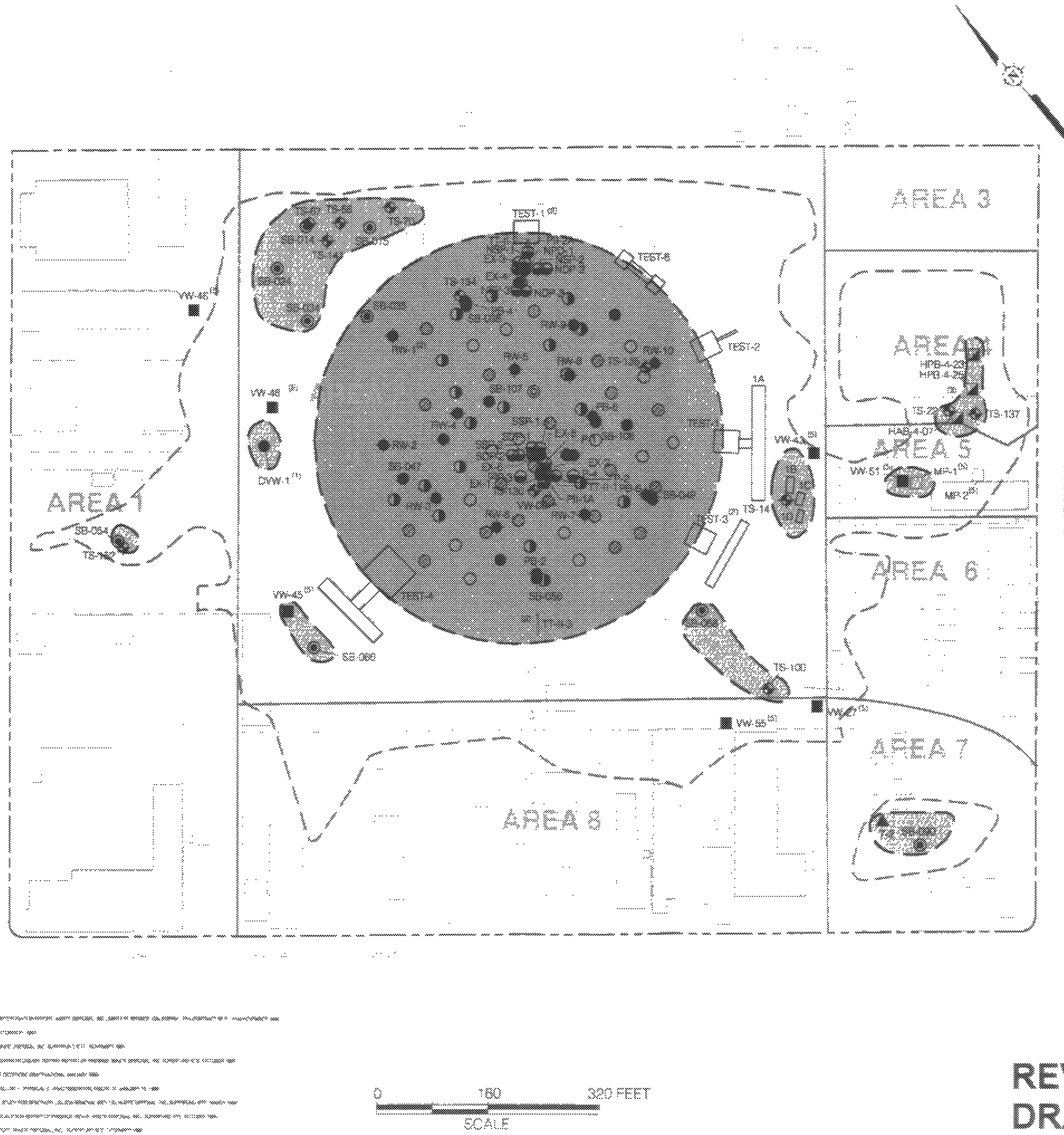
WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE 2.3

PARTIALLY SCANNED OVERSIZE ITEM (S)

See Document # 94527
for partially scanned image(s).

For complete version of oversize document(s),
see paper copy.



LEGEND

- SITE BOUNDARY
- AREA BOUNDARY
- BURIED WASTE MATERIAL DELINEATION
- TEST TRENCHES/PITS
- POTENTIAL AREA OF RESERVOIR LIQUIDS
- POTENTIAL AREA OF LIQUIDS OUTSIDE RESERVOIR
- SINGLE PIEZOMETER WELL (WATER) 1998 CDM FIELD INVESTIGATION
- SINGLE PIEZOMETER WELL (WATER/OIL) 1998 CDM FIELD INVESTIGATION
- SINGLE PIEZOMETER WELL (SLUDGE) 1998 CDM FIELD INVESTIGATION
- SINGLE PIEZOMETER WELL (OIL) 1998 CDM FIELD INVESTIGATION
- DUAL PIEZOMETER WELL (OIL) 1998 CDM FIELD INVESTIGATION
- TM No. 13 EXTRACTION WELLS
- TM No. 6 AND 8 EXXTRACTION WELLS
- 1989 RI SOIL BORINGS
- 1997 WDIG GEOPROBE
- WDIG/EPA VAPOR WELLS (1997-1998)
- MONITORING POINTS INSTALLED BY OTHERS
- 1995 PRE-DESIGNBORINGS
- 1998 ERT BORINGS

NOTES

(1) SVE WELL NOT COMPLETED DUE TO LIQUIDS

(2) SEVERAL LOCATIONS WITHIN RESERVOIR WERE DRY.

(3) POSSIBLE IRRIGATION WATER.

(4) ERT TEST PITS AND TRENCHES NOT TO SCALE.

(5) SHALLOW VAPOR WELL SAMPLES WERE NOT COLLECTED FROM THE FOLLOWING WELLS AND DATES DUE TO LIQUIDS IN THE PROBES:

VW-27 (2/98)
VW-43 (2/98)
VW-45 (2/98, 4/98)
VW-46 (2/98, 4/98, 4/99)
VW-48 (4/98)
VW-55 (2/98, 4/99)
MP-1 (2/98)
MP-2 (2/98)
VW-51 WAS NOT SAMPLED AT ALL DURING 1998 BUT HAS BEEN SAMPLED FOR TWO QUARTERS IN 1999

BORING LOGS DID NOT INDICATE FREE LIQUIDS, EXCEPT FOR VW-45

ID TYPE	INVESTIGATION
SB-066	1989 REMEDIAL INVESTIGATION
TS-22	1997 WDIG GEOPROBE INVESTIGATION
EX-5/NOP-1	TM No. 6 AND 8 WELLS
TT-4-3	WDI TEST TRENCHES
TEST-2	EPA TEST TRENCHES/PITS
7-2	ERT AREA 7 GEOPROBE INVESTIGATION
VW-51	VAPOR WELL

REV. 2.0 DRAFT

PERCHED LIQUIDS ZONES

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 2.5

94-256RSFS-26 REV 07/25/00

REV. 2.0
DRAFT

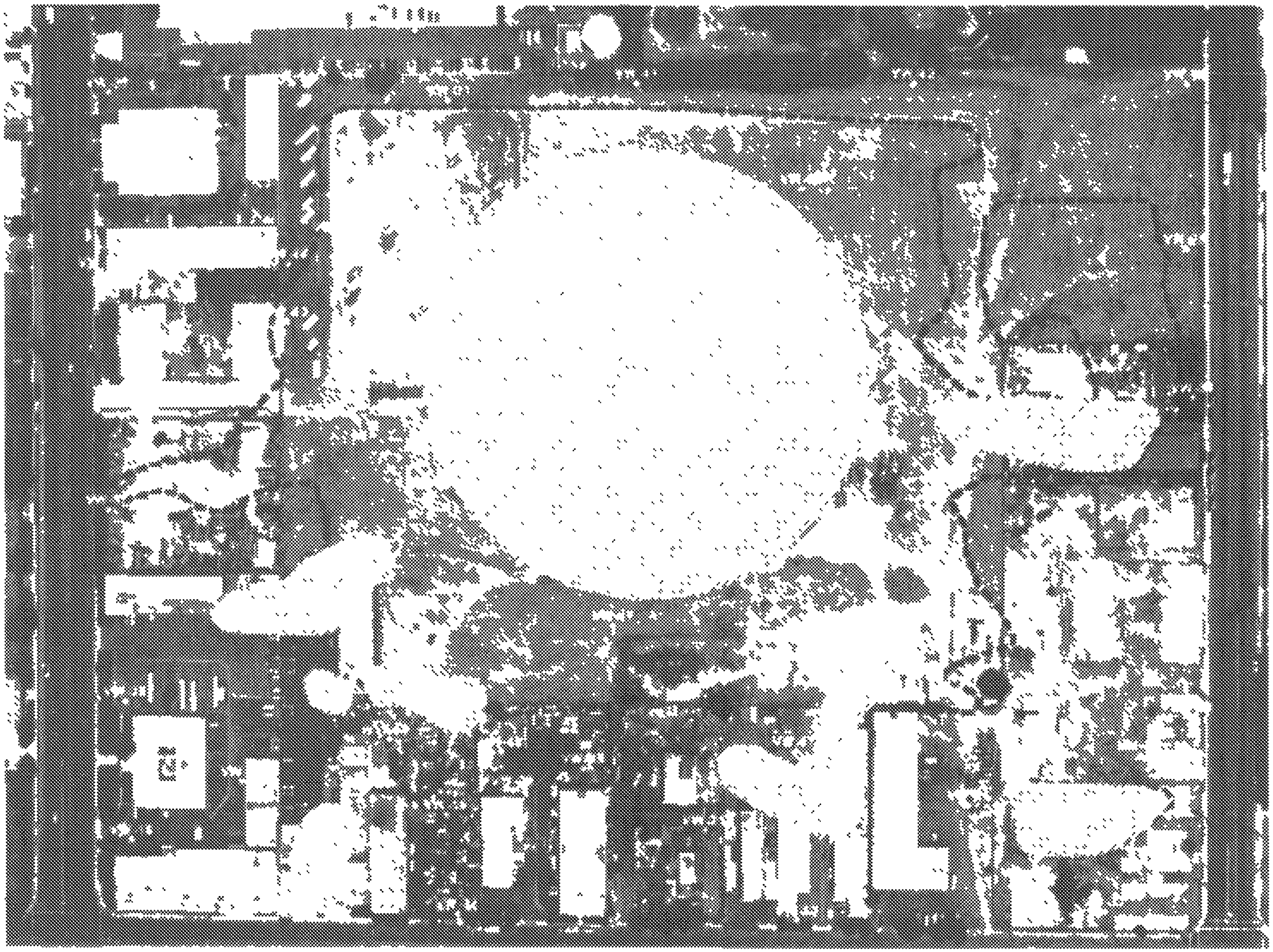
PROJECT NAVIGATOR, LTD.

PERCHED LIQUIDS ZONES

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 2.6



REV. 2.0
DRAFT

PROJECT NAVIGATOR, LTD.

LOCATION OF VAPOR WELLS

WASTE DISPOSAL INC
SANTA FE SPRINGS CALIFORNIA

TRC

FIGURE 2.7

94-256RSFS-08 REV 07/25/98

REV. 2.0
DRAFT

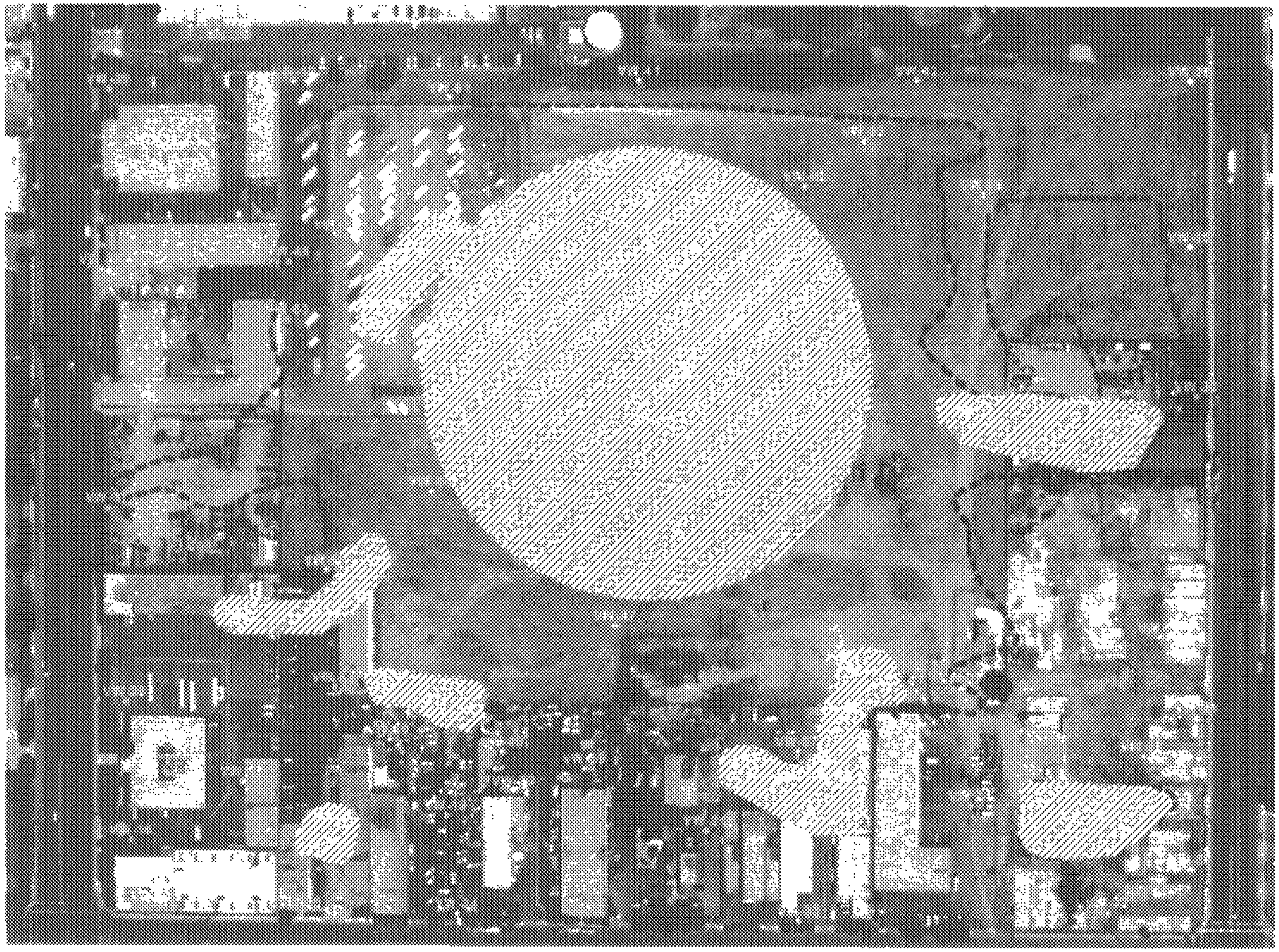
PROJECT NAVIGATOR, LTD.

EXCEEDANCES OF METHANE (1.25%), BENZENE (100 ppb) AND VINYL CHLORIDE (25 ppb) CRITERIA FOR VAPOR WELL NETWORK

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC	FIGURE 2.8

94-256RSFS-09 REV 07/25/99



REV. 2.0
DRAFT

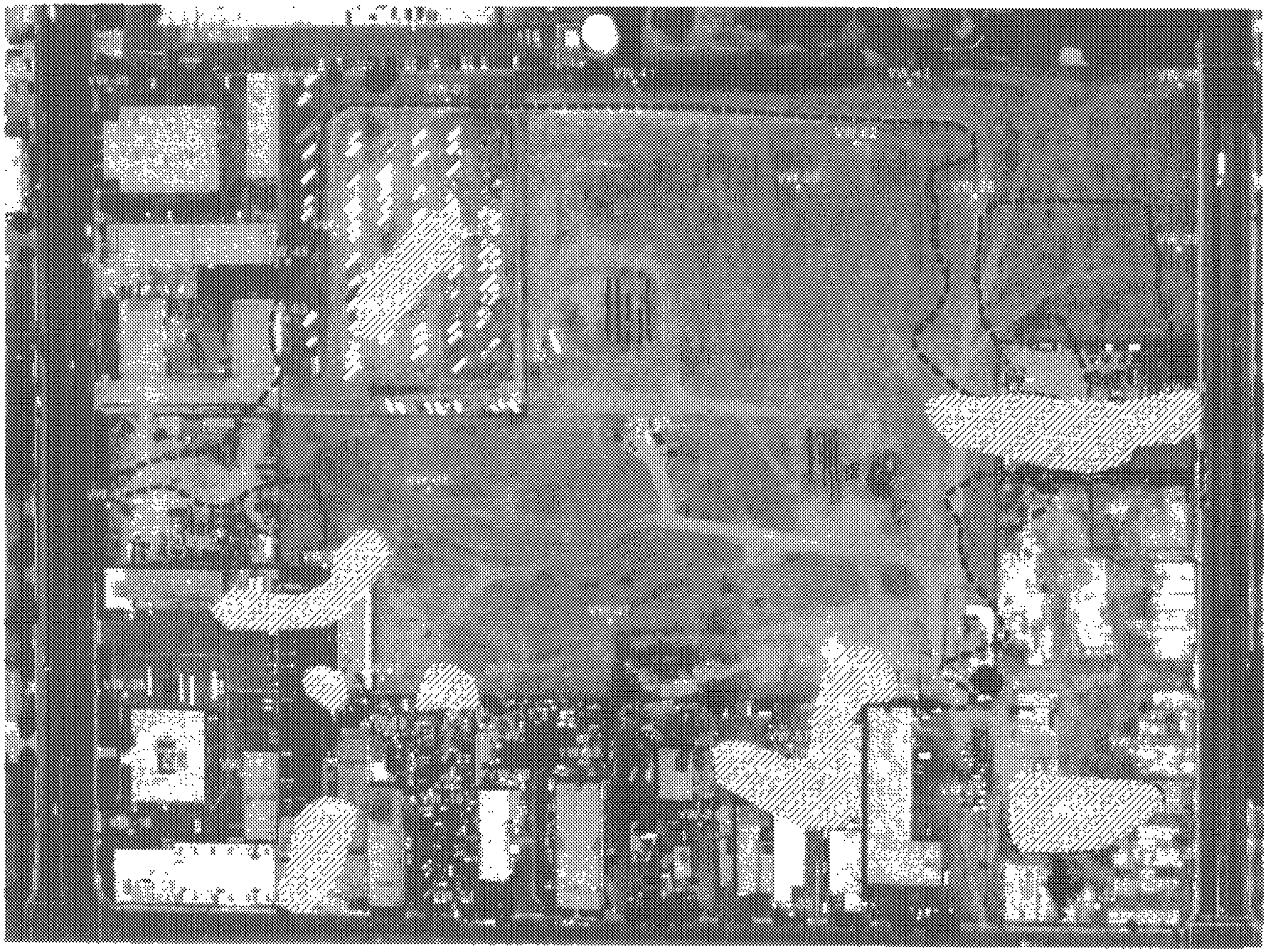
PROJECT NAVIGATOR, LTD.

AREAS WITH
VERIFIED EXCEEDANCES

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 2.9



REV. 2.0
DRAFT

PROJECT NAVIGATOR, LTD.

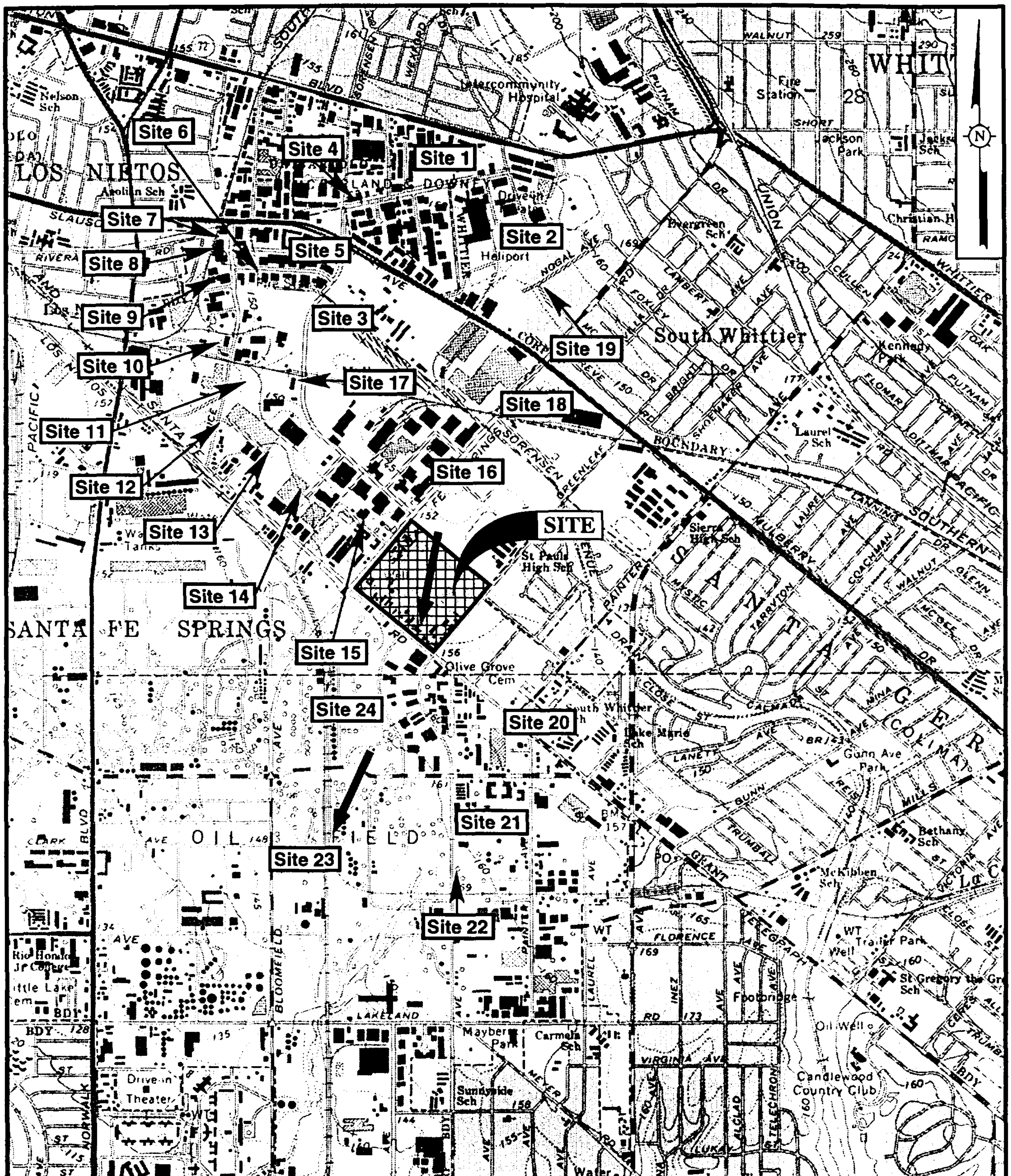
AREAS WITH
VERIFIED EXCEEDANCES

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 2.10

94-256RSFS-23 REV. 07/24/00



0 2,000 4,000 FEET

SCALE

REV. 2.0 DRAFT

LEGEND

Site 1 CHEMICAL RELEASE SITE

GROUNDWATER FLOW DIRECTION

REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP OF WHITTIER, CALIFORNIA, DATED 1981.

CHEMICAL RELEASE SITES IN VICINITY OF WDI

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 2.11

3.0 IDENTIFICATION OF CHEMICALS OF CONCERN, ASSOCIATED RISKS AND REMEDIAL RESPONSE ACTIONS

1. CERCLA, as amended, mandates protective and cost-effective remedial actions. Remedial actions, as defined by 40 Code of Federal Regulations (CFR) Part 300.5 of the NCP, are those responses to releases that are consistent with a permanent remedy to protect against and minimize the release of hazardous substances, pollutants or contaminants so they do not migrate and cause substantial danger to present and future public health and welfare or the environment.

2. Section 121 of the CERCLA requires that EPA select a remedy that protects human health and the environment, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. Furthermore, Section 121 requires that upon completion, remedies attain ARARs, and federal, state and local requirements, unless specified waivers are invoked.

3. Section 300.430 of the NCP, in conjunction with the EPA guidance document entitled "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA," (EPA, 1988) sets forth the remedial alternative development and remedy selection process. In July 1999, "A Guide to Preparing Superfund Proposed Plans, Records of Decision, and other Remedy Selection Decision Documents" was issued by EPA, and was also used in preparing this SFS.

4. The nature and extent of contamination at the Site is documented in several WDIG and EPA reports completed during 1999, as well as EPAs prior RI, and the WDIGs draft RD Investigative Activities Report, currently undergoing EPA review.

5. As part of EPAs September 16, 1999, comments to the 1998 Preliminary Draft Supplemental Feasibility Study, they provided the Site COCs, and a summary of the 1989 Endangerment Assessment. This information is presented in Section 3.1. Although they may not concur with the results, WDIG has incorporated this information into the SFS to facilitate the remedy selection process.

3.1 ENDANGERMENT ASSESSMENT

3.1.1 1989 EPA RISK ASSESSMENT

1. In November 1989 EPA prepared an Endangerment Assessment for the Site (EBASCO, 1989d). This assessment quantitatively evaluated the risks to current and future human receptors at the Site. While the Endangerment Assessment also included a qualitative ecological assessment that predicted contamination at the Site may impact wildlife, it is located in an industrial area and does not represent a significant habitat for wildlife. The following sections (Section 3.1.2 through 3.1.10) are a summary of the 1989 Preliminary Endangerment Assessment, as provided by EPA in 1999.

3.1.2 IDENTIFICATION OF CHEMICALS OF CONCERN

1. EPA used data collected during the RI by EBASCO (1988; 1989a,b,c,e) to identify COCs in soil, soil gas and ground water. The COCs identified in soil gas include benzene, carbon tetrachloride, chloroform, 1,2-dibromoethane, 1,2-dichloroethane, tetrachloroethene, 1,1,1-TCE, trichloroethene and vinyl chloride. The COCs in soil include 10 metals, 7 chlorinated pesticides, 17 VOCs, polyaromatic hydrocarbons (PAHs) and PCBs. For ground water, the COCs include arsenic, lead, manganese, mercury, toluene, carbon tetrachloride, chloroform, PCE and TCE. Refer to Table 3.1 for a complete list of COCs for each media.

2. In general, the Endangerment Assessment used the following criteria to identify COCs:
   - **Comparison with blanks**: The Endangerment Assessment used travel or field blanks to identify compounds that are not site-related.
   - **Comparison with background concentrations**: The Endangerment Assessment typically did not identify inorganics as COCs if sample concentrations were less than five times the background concentrations.
   - **Frequency of detection**: The Endangerment Assessment typically did not identify a chemical as a COC if it was detected in less than 5 percent of the samples.
   - **Consideration of concentration, toxicity and physiochemical properties**: The Endangerment Assessment typically did not identify compounds with very low toxicity as COCs. Conversely, the Endangerment Assessment did identify highly toxic compounds as COCs.

3. Table 3.2 provides various regulatory-based cleanup levels for COCs, as a reference. Table 3.2 also provides industrial Preliminary Remediation Goals (PRGs) for soils, ground water and ambient air. Since cleanup levels have not been specifically defined, this SFS has used preliminary guidance and criteria as cleanup levels for the comparison of alternatives.

3.1.3 TOXICITY ASSESSMENT

1. For risk assessment purposes, the human health effects of chemicals were separated into two categories of toxicity: noncarcinogenic and carcinogenic effects. This distinction relates to currently held scientific opinion that the mechanisms of action for these categories differ. For carcinogens, it was assumed that there was no level of exposure, which does not have a finite possibility of causing the disease (e.g., there is no threshold dose for carcinogenic effects). For chemicals exhibiting noncarcinogenic effects, it is believed that organisms have protective mechanisms that must be overcome before the toxic endpoint is produced (e.g., there is a threshold dose for these effects). For example, if a large number of cells perform the same or similar functions, it would be necessary for significant damage or depletion of these cells to occur before a toxic effect could be seen. This threshold view for noncarcinogenic effects holds that a range of exposures up to a defined threshold can be tolerated by the organism without appreciable risk of causing the disease.

2. The following paragraphs describe the toxicity values EPA has developed to evaluate noncarcinogenic and carcinogenic effects. It should be noted that many contaminants have the potential for both noncarcinogenic and carcinogenic effects. For this Endangerment Assessment, the two primary sources containing the EPA-derived toxicity values are the Integrated Risk Information System (IRIS) and health effects assessment documents developed for individual contaminants. IRIS is a database containing the most up-to-date and EPA toxicity values.

3.1.4 REFERENCE DOSES (NONCARCINOGENIC EFFECTS)

1. Reference Doses (RfDs) are the toxicity values used to evaluate noncarcinogenic effects. A RfD, expressed in units of daily milligrams per kilogram (mg/kg-day), represents an estimate of a daily exposure concentration that will not result in adverse effects in the most sensitive of individuals during a lifetime. If exposure to contaminated media results in an estimated intake exceeding the RfD (Exposure/RfD > 1), then there is a potential for adverse health effects. The EPA typically derives RfDs from human epidemiology studies or laboratory animal studies in which a threshold level or no-observed-adverse effect level

(NOAEL) has been identified. To establish a RfD, EPA usually divides the NOAEL by uncertainty factors to account for sensitive humans, extrapolation of animal data to humans, and of acute or subchronic exposure to chronic exposure. Table 3.3 presents the oral and inhalation RfDs used in this Endangerment Assessment, as well as, the sources of the RfDs.

3.1.5 CANCER SLOPE FACTORS

1. To evaluate carcinogenic effects, EPA has developed cancer slope factors that defines relationship between the dose and response of a chemical. Slope factors, expressed in units of $(mg/kg\text{-}day)^{-1}$, estimate the probability of developing cancer per unit intake of a chemical (exposure x slope factor = cancer probability). The EPA derives slope factors from laboratory studies with animals or from human epidemiology studies. The EPA applies several mathematical models to extrapolate carcinogenic responses observed in relatively high doses administered to laboratory animals (or exposures noted in epidemiologic studies) to the lower exposure levels expected for human contact in the environment. In general, after the data are fit to an appropriate model, EPA calculates the upper 95^{th} percentile confidence limit of the slope of a resulting dose-response curve. This value is a slope factor and represents the upper 95^{th} percent confidence limit on a probability of a response per unit intake of a chemical over a lifetime (e.g., there is a 5 percent chance that the probability of a response could be greater than the estimated value).

2. For many chemicals, the carcinogenic potential is inconclusive. Animal studies may suggest a chemical is carcinogenic, while human studies may not. For this reason, EPA classifies chemicals into one of the following groups, according to the weight of evidence of cancer:
   - Group A - Human carcinogen (sufficient evidence of carcinogenicity in humans).
   - Group B - Probable human carcinogen (B1 - limited evidence of carcinogenicity in humans; B2 - sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans).
   - Group C - Possible human carcinogen (limited evidence of carcinogenicity in animals and inadequate or lack of human data).
   - Group D - Not classifiable as to human carcinogenicity. Inadequate human and/or animal data are available.
   - Group E - No evidence of carcinogenicity in adequate human or animal studies.

3. The EPA typically develops slope factors for chemicals classified in Groups A, B1 and B2, and on a case-by-case basis for chemicals in Group C. Table 3.3 presents the slope factors and weight of evidence classification for each COC. The EPA source for each slope factor is also shown in Table 3.3.

3.1.6 EXPOSURE ASSESSMENT

1. This section identifies potentially exposed populations and quantifies the potential exposure to these populations. Figure 1.2 shows the general features of the Site. Currently, the Site consists of a buried concrete waste reservoir surrounded by a vacant unpaved lot and numerous businesses. St. Paul High School is located along the northern border and residential areas are immediately across Greenleaf Avenue from the Site. For the current land-use conditions, the Endangerment Assessment quantitatively evaluated exposure for the following receptors and exposure pathways.
   - Trespassers
   - Onsite workers

2. The most likely future land-use for the Site is industrial. However, as a worst-case reasonable maximum exposure scenario, the Endangerment Assessment assumed the Site may be developed for residential purposes. For future land-use conditions, the Endangerment Assessment quantitatively evaluated exposure for the following receptors and exposure pathways.
   - Trespassers
   - Onsite residents with use of ground water

3.1.7 ESTIMATION OF DAILY INTAKES

1. The EPA estimated both an average exposure and daily intake and a plausible maximum intake for current and future receptors at the Site. The EPA estimated average daily intake using mean soil, soil gas and ground water concentrations, and what are considered average exposure parameters. For the plausible maximum intake, EPA used the maximum soil, soil gas and ground water concentrations, together with upper range estimates for exposure parameters. Table 3.4 presents the values and calculations used to estimate exposure. Methods used to estimate exposure point concentrations are described below.

3.1.8 EXPOSURE POINT CONCENTRATIONS

1. Concentration at the point of human contact is known as exposure point concentration. This Endangerment Assessment estimated an average and a plausible maximum exposure point concentration. For potential exposure to contaminants in soil and ground water, EPA assumed that the exposure point is at the same collection point (e.g., soil sample location and ground water monitoring well location). For these media, EPA used the geometric mean of all sampling locations to calculate an average exposure point and maximum detected concentration to calculate the plausible maximum exposure point concentration. For the potential exposure to contaminants in air, modeling was required to estimate exposure point concentrations.

2. Under the current land-use scenario, EPA assumed trespassers might be exposed to surface soils. For this scenario, EPA used 34 surface samples collected during the RI to estimate exposure point concentrations. Under the future land-use scenario, the Endangerment Assessment assumed future residents may be exposed to contaminants present in the first 20 feet of soil as a result of grading and other construction activities. For this scenario, EPA estimated exposure point concentrations using soil samples collected from 0 to 20 feet bgs.

3. Contaminants in soil and soil gas at the Site may be transported to a downwind receptor. The Endangerment Assessment used a Gaussian dispersion model (Turner, 1970) to measure exposure point concentrations in ambient air at locations 0.1, 0.5 and 1 kilometer (km) downwind of the Site. The risk assessment also used a one-compartment indoor air model along with soil gas results of 26 vapor well samples to estimate indoor air concentrations for future residents living onsite. This modeling approach resulted in indoor air concentrations approximately 100 times less than the subsurface soil gas concentrations.

3.1.9 RISK CHARACTERIZATION

1. To estimate cancer risks, the chronic daily intake (CDI) for each exposure pathway are multiplied by slope factors (SF) (CDI x SF = cancer risk). The resulting risk estimate represents incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Table 3.5 presents the cancer risk estimates for current and future land-use conditions.

2. To estimate noncarcinogenic risks, the CDI for each exposure pathway is divided by the RfD (CDI/RfD = hazard quotient). The sum of all the hazard quotients for each COC is the hazard

index (HI). The RfD is an estimate of a daily exposure concentration that will not result in adverse effects in the most sensitive of individuals during a lifetime. When the estimated CDI exceeds the RfD, there may be a concern for adverse effects. Table 3.5 presents the HIs estimates for each exposure pathway.

3. Risks estimated in the Endangerment Assessment have a large degree of uncertainty as a result of assumptions made regarding exposure and toxicity. When estimating exposure, the Endangerment Assessment made many conservative assumptions that may result in an overestimation of risks. When estimating plausible maximum exposure point concentrations, for example, the Endangerment Assessment assumed an individual will be exposed to the maximum soil or ground water concentration of every COC. In addition, the Endangerment Assessment assumed that contaminant concentrations will remain constant over time and that degradation of contaminants will not occur. Toxicity factors (RfDs and slope factors) are also conservative estimates that are likely to overestimate risks.

3.1.10 CONCLUSIONS AND RECOMMENDATIONS

1. As noted above, both current and future risks were estimated in the Endangerment Assessment pursuant to NCP. Both current and future risks need to be considered to demonstrate that a site does not present an "unacceptable risk" to human health and the environment. "Acceptable risk" is generally defined as where cumulative carcinogenic risk to an individual based on a reasonable maximum exposure (RME) is less than 10^{-4} (e.g., 1 in 10,000 chances of cancer) and noncarcinogenic HI is less than 1. Conversely, "unacceptable risk" is often defined as those that exceed either of these criteria.

2. Refer to Table 3.5 for the current Site risk exposure estimates, current land use risks based on RME for exposure scenarios that fall below a 10^{-4} cancer risk and a noncarcinogenic HI of 1. Therefore, EPA considers current risk exposure estimates to be "acceptable."

3. However, for future scenarios the site-specific risk estimates (see Table 3.5) exceed a 10^{-4} cancer risk for three potential future residential exposure pathways: (1) direct contact with soils; (2) ingestion of ground water; and (3) inhalation of volatile chemicals in indoor air. Based on the above criteria, these risk exposure estimates under a residential scenario are considered "unacceptable" by EPA.

4. Generally, where site risks to an individual using RME exposure assumptions for either current or future land use exceed a 10^{-4} lifetime excess cancer risk, action under CERCLA is warranted. Therefore, it is recommended that actions be considered to reduce potential risks associated with future land use.

3.2 GENERAL RESPONSE AND REMEDIAL ACTION OBJECTIVES

1. General Response Actions (GRAs) are defined by the NCP and CERCLA (as amended by the Superfund Amendments and Reauthorization Act [SARA]) as those actions that will satisfy the remedial action objectives. They may include treatment, containment, excavation, extraction, disposal, institutional actions or a combination of these, and are applicable to all Superfund sites. CERCLA defines the statutory requirements for developing remedies. The remainder of this section addresses the development of the Remedial Action Objectives (RAOs) for the Site. RAOs consist of medium-specific or operable unit-specific goals for protecting human health and the environment. The objectives should be as specific as possible, but not so specific that the range of alternatives that can be developed is unduly limited.

3.2.1 ESTABLISHING RISK BASED GUIDANCE FOR CLEANUP

1. This Section outlines the preliminary RAOs and discusses the GRAs developed to address the preliminary RAOs. These RAOs and GRAs were developed to facilitate the FS evaluation process and will be finalized when the ROD is completed. Site-specific RAOs relate to specific contaminated media and to potential exposure routes and identified target remediation levels. Site-specific objectives, which require an understanding of contaminants and physical properties in their respective media, are based on the evaluation of risk to public health and the environment and on the RAOs. Preliminary Remediation Goals (PRGs) are used to achieve ARARs and typically identified for selective or target COCs.

2. The NCP requires that the selected remedy meet the following objectives:
   - Each remedial action selected shall be protective of human health and the environment [40 CFR 300.430(f)(1)(ii)(A)].
   - Onsite remedial actions that are selected must attain those ARARs that are identified at the time of the ROD [40 CFR 300.430(f)(1)(ii)(B)].
   - Each remedial action selected shall be cost-effective. A remedy shall be cost-effective if its costs are proportional to overall effectiveness [40 CFR 300.430(f)(1)(ii)(D)].

- Each remedial action shall use permanent solutions and alternative treatment technologies or resource recovery technology to the maximum extent practicable [40 CFR 300.430(f)(1)(iii)(E)].

3. The statutory scope of CERCLA was amended by SARA to include the following general objectives for remedial action at CERCLA sites.

   - Remedial actions "shall attain a degree of cleanup of hazardous substances, pollutants and contaminants released into the environment and of control of further release at a minimum which assures protection of human health and the environment" [CERCLA, Section 121(d)(1)].
   - Remedial actions "in which treatment that permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants and contaminants is a principal element" [Section 121(b)] are preferred. If the treatment or recovery technology selected is not a permanent solution, an explanation must be published.
   - The least favored remedial actions are those that include "offsite transport and disposal of hazardous substances or contaminated materials without treatment where practicable treatment technologies are available" [Section 121(b)].
   - The selected remedy must comply with or attain the level of "standard, requirement, criteria, or limitation under any federal environmental law or promulgated standard, requirement, criteria, or limitation under a state environmental or facility siting law that is more stringent than any federal standard requirement, criteria, or limitation" [CERCLA, Section 121(d)].

4. The potential health risks estimated in the 1989 Endangerment Assessment are based on RME scenarios. This methodology is intended to provide a conservative health-risk estimate, and is intended to over estimate, rather than under estimating the Site risks. The 1989 Endangerment Assessment also used the same RME methodology.

5. In establishing the RAOs, the following exposure pathways were evaluated for current land use in the Endangerment Assessment:

   - Trespassers contacting contaminated surface soil.
   - Offsite residents and students at the adjacent high school inhaling contaminants in ambient air from subsurface gas migration.
   - Offsite residents and students at the adjacent high school inhaling airborne particles from contaminated surface soil.

6. For future land use scenarios, the 1989 Endangerment Assessment assumed a residential scenario. Presently, the anticipated future use of the property is commercial/industrial so the assumption of residential use in the 1989 report is considered to be a conservative,

health-protective assumption. Because of the proximity of residences and a school, and the growth in the area, this assumption is reasonable. The following exposure pathways were evaluated in the Endangerment Assessment:

- Onsite residents contacting contaminated surface soil.
- Onsite residents ingesting contaminated ground water.
- Onsite residents inhaling contaminants in indoor air from subsurface gas migration.
- Students inhaling contaminants in ambient air from subsurface gas migration.

3.2.2 REMEDIAL ACTION OBJECTIVES

1. As explained in Section 3.1 and shown in Table 3.1, the RAOs are media-specific health-based concentrations for COCs. Table 3.2 indicates the various regulatory limits of concern, as well as, the existing ROD Standards and Region 9 PRGs for soils, ground water and ambient air.

2. Media-specific RAOs are addressed in the following sections.

3.2.2.1 Soils

1. To assure protection of human health under current and future Site conditions, it is necessary to establish soil action levels. Since there are not chemical-specific ARARs for soil contamination, soil action levels are generally based on the greater of either PRG (equivalent to 1×10^{-6} risk) or HI greater than 1 for noncarcinogens, or a level that exceeds background concentrations. As part of the 1993 ROD, EPA established soil cleanup levels for the metal COCs and selected organics as shown in Table 3.2. For purposes of this SFS, the PRGs shown in Table 3.2 will be used as cleanup standards for the remaining COCs for soils.

3.2.2.2 Soil Gas

1. RAOs for soil gases have been developed and presented as part of the EPA 1999 Subsurface Gas and In-Business Air Sampling Evaluation Report. Based on the EPA assessment of subsurface gas conditions and risks, they established Provisional Soil Gas Performance Standards for benzene, vinyl chloride and methane, and the remaining VOCs identified in Table 3.1, based on assumed exposure conditions for onsite buildings.

2. Table 3.6 provides EPA Provisional Soil Gas Performance Standards. As indicated in Table 3.6, the primary risk drivers are benzene at 10.0 parts per billion by volume (ppbv) and vinyl chloride at 1.0 ppbv. The CIWMB Methane Standards of 5.0 percent at the Site perimeter and 1.25 percent in onsite buildings are also considered RAOs.

3.2.2.3 Liquids Located Within and Outside the Reservoir Boundary

1. For the purposes of this SFS, the RAOs are to: (1) prevent human exposure, including direct contact, consumption, and other uses of liquids, to Site liquids at levels exceeding the MCLs as shown in Table 3.2; and (2) prevent contribution of Site liquids or leachate above ARARs to ground water.

3.2.2.4 Ground Water

1. For the purposes of this SFS, the RAO is to prevent exposure by the public to ground water which exceeds existing state and federal MCLs shown in Table 3.2. Ground water at the Site will be restored to its beneficial uses wherever practicable.

3.2.3 GENERAL RESPONSE OBJECTIVES

1. A summary of GRAs and RAOs is provided in Table 3.7. The following sections describe GRAs by each Site media.

3.2.3.1 Soils

1. Under current use conditions, soils may present a potential exposure pathway by direct contact, ingestion or inhalation of soil particulates. However, existing data indicate the vast majority of waste materials in the reservoir and surrounding areas are generally below 5 feet in depth, thereby limiting a potential for exposure. The GRAs for soils are to prevent exposure of workers, trespassers or local residents to contaminated soils. This objective may be accomplished using a variety of actions, as shown in Table 3.7. GRAs include the following:
   - No Further Action
   - Institutional Controls
   - Containment
   - Excavation
   - Treatment

3.2.3.2 Soil Gas

1. Volatile organics including methane and other hydrocarbons have been detected in various locations of the Site as previously discussed in Chapter 2.0. The soil gases appear to only pose a risk to occupants of businesses located in onsite buildings. Quarterly in-business monitoring of selected businesses has not shown significant levels of gas entering these buildings. The GRAs for soil gas are to prevent inhalation of carcinogens in excess of the acceptable risk level of 10^{-4} to 10^{-6}. This objective may be accomplished by the following GRAs, which include:
   - No Further Action
   - Institutional Controls
   - Containment
   - Treatment
   - Excavation

3.2.3.3 Liquids Located Within and Outside the Reservoir Boundary

1. Two potential exposure pathways may exist for liquids to pose a Site risk. The primary pathway of concern would be a release of liquids from the reservoir or from buried waste in unlined pits outside the reservoir, which could migrate to ground water. The remaining pathway is the potential for exposure during remedial activities (e.g., excavation). The GRAs for Site liquids are provided in Table 3.7. These response actions include the following:
   - No Further Action
   - Institutional Controls
   - Collection
   - Containment

3.2.3.4 Ground Water

1. Under current use conditions, existing complete ground water pathways have not been identified. Table 3.7 provides a summary of GRAs for ground water. The GRAs include the following:
   - No Further Action
   - Institutional Controls
   - Pump and Treat

TABLE 3.1

CHEMICALS OF POTENTIAL CONCERN FOR ALL SITE MEDIA
WASTE DISPOSAL, INC. SUPERFUND SITE

CHEMICAL	SURFACE SOIL	SOILS (0 - 20 ft.)	GROUND WATER	SUBSURFACE SOIL GAS
Inorganics				
Antimony	X	X		
Arsenic	X	X	X	
Cadmium	X	X		
Chromium	X	X		
Copper	X	X		
Lead	X	X	X	
Manganese		X	X	
Mercury	X	X	X	
Selenium	X	X		
Thallium	X	X		
Zinc		X		
Chlorinated Pesticides				
Aldrin		X		
gamma-BHC (lindane)		X		
Chlordane	X	X		
DDT, DDD, DDE	X	X		
Dieldrin	X	X		
Heptachlor		X		
Heptachlor Epoxide	X	X		
Volatile Organic Compounds				
Pentachlorophenol	X	X		
Benzene	X	X		X
1,4-Dichlorobenzene		X		
Ethylbenzene	X	X		
Toluene	X	X	X	
Xylenes	X	X		
Benzoic Acid	X	X		
2-Butanone	X	X		
Carbon Tetrachloride		X	X	X
Chloroform		X	X	X
1,2-Dibromoethane				X
1,2-Dichloroethane				X
Methylene chloride	X	X		
Tetrachloroethene		X	X	X
1,1,1-Trichloroethane		X		X
Trichloroethene		X	X	X
Vinyl chloride		X		X
Polycyclic Aromatic Hydrocarbons				
Noncarcinogenic	X	X		
Carcinogenic	X	X		
Polychlorinated Biphenyls (PCBs)	X	X		

94-256/Rpts/SFS (6/15/00/jb)

Note: Table provided by EPA on September 16, 1999.

TABLE 3.2

SUMMARY OF PRELIMINARY CHEMICALS OF CONCERN WITH THEIR RESPECTIVE REGULATORY LIMITS AND INDUSTRIAL CLEANUP GOALS WASTE DISPOSAL, INC. SUPERFUND SITE

CHEMICAL	1994 WDI ROD STANDARDS (mg/kg)	TCLP Limit (mg/L)	STLC (mg/L)	MCL (mg/L)	TTLC (mg/kg)	INDUSTRIAL PRGs (October 1, 1999)			RESIDENTIAL PRGs
						Soils (mg/kg)	Ground Water/ Tap Water (µg/L)	Ambient Air (ppbv)	Soils (µg/kg)
Antimony	NE	NE	15	0.006	500	750	15	–	31
Arsenic	10	5	5	0.05	500	3	0.045	–	0.38
Cadmium	39	1	1	0.005	100	930	18	0.0011	38
Chromium	44	5	5	0.05	500	450	–	0.00016	315
Copper	NE	NE	25	1	2,500	70,000	1,400	–	2,800
Lead	500	5	5	0.015	1,000	1,000	4.0	–	130
Manganese	NE	NE	NE	0.05	NE	45,000	1,700	0.051	3,200
Mercury	NE	0.2	0.2	0.002	20	560	10.1	–	23
Silver	NE	5	5	0.1	500	9,400	180	–	380

TCLP = Toxicity Characteristics Leaching Procedure, 40 CFR, Part 26.
STLC = Soluble Threshold Limit Concentration, CCR Title 22.
TTLC = Total Threshold Limit Concentration, CCR Title 22.
PRG = Preliminary Remediation Goal (October 1, 1999).
NE = None Established.
MCL = Maximum Contaminant Level based on CCR Title 22 (MCLs will be used to assess groundwater protectiveness based on TCLP and STLC results).
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
µg/L = micrograms per liter.
ppbv = parts per billion by volume.

TABLE 3.2

SUMMARY OF PRELIMINARY CHEMICALS OF CONCERN WITH THEIR RESPECTIVE REGULATORY LIMITS AND INDUSTRIAL CLEANUP GOALS WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

CHEMICAL	1994 WDI ROD STANDARDS (mg/kg)	TCLP Limit (mg/L)	STLC (mg/L)	MCL (mg/L)	TTLC (mg/kg)	INDUSTRIAL PRGs (October 1, 1999)			RESIDENTIAL PRGs
						Soils (mg/kg)	Ground Water/ Tap Water (µg/L)	Ambient Air (ppbv)	Soils (µg/kg)
Thallium	12	NE	7	0.002	70	170	2.9	–	6.9
Zinc	NE	NE	250	5	5,000	100,000	11,000	–	23,000
Aldrin	NE	NE	0.14	NE	1.4	0.18	0.004	0.0004	0.028
Anthracene	NE	NE	NE	NE	NE	5.7	1,800	1,100	5.7
Benzene	2.7	0.5	NE	0.001	NE	1.4	0.39	0.10	0.063
Benzo(a)pyrene	0.23	NE	NE	NE	NE	0.36	0.0015	0.0009	0.061
Benzo(b)fluoranthene	0.23	NE	NE	NE	NE	3.6	0.09	0.009	0.61
Benzo(k)fluoranthene	0.23	NE	NE	NE	NE	36	0.92	0.092	6.1
Carbon Tetrachloride	NE	0.5	NE	0.0005	NE	0.52	0.39	0.23	0.23
Chlordane	NE	0.03	0.25	0.0001	2.5	12	0.052	0.0052	0.34
Chlorobenzene	NE	100	NE	0.07	NE	180	39	21	65
Chloroform	NE	6	NE	NE	NE	0.52	0.16	0.084	0.25

TCLP = Toxicity Characteristics Leaching Procedure, 40 CFR, Part 26.
STLC = Soluble Threshold Limit Concentration, CCR Title 22.
TTLC = Total Threshold Limit Concentration, CCR Title 22.
PRG = Preliminary Remediation Goal (October 1, 1999).
NE = None Established.
MCL = Maximum Contaminant Level based on CCR Title 22 (MCLs will be used to assess groundwater protectiveness based on TCLP and STLC results).
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
µg/L = micrograms per liter.
ppbv = parts per billion by volume.

TABLE 3.2

SUMMARY OF PRELIMINARY CHEMICALS OF CONCERN WITH THEIR RESPECTIVE REGULATORY LIMITS AND INDUSTRIAL CLEANUP GOALS WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

CHEMICAL	1994 WDI ROD STANDARDS (mg/kg)	TCLP Limit (mg/L)	STLC (mg/L)	MCL (mg/L)	TTLC (mg/kg)	INDUSTRIAL PRGs (October 1, 1999)			RESIDENTIAL PRGs
						Soils (mg/kg)	Ground Water/ Tap Water (µg/L)	Ambient Air (ppbv)	Soils (µg/kg)
Chrysene	NE	NE	NE	NE	NE	360	9.2	0.92	6.1
DDT	5	NE	0.1	NE	1	13	0.20	0.020	1.3
1,2-Dibromoethane	NE	NE	NE	NE	NE	0.029	0.00076	0.0087	0.003
1,2-Dichlorobenzene					NE	700	370	210	700
1,2-Dichloroethane	NE	0.5	NE	0.0005	NE	0.76	0.12	0.074	0.25
Dieldrin	0.11	NE	0.8	NE	8	0.19	0.0042	0.00042	0.028
Ethylbenzene	NE	NE	NE	0.7	NE	230	1,300	1,300	230
Fluoranthene	NE	NE	NE	NE	NE	27,000	1,500	150	2,600
Fluorene	NE	NE	NE	NE	NE	90	240	150	90
Heptachlor	NE	0.008	0.47	0.00001	4.7	0.67	0.015	0.0015	0.099
Heptachlor Epoxide						0.21	0.0074	0.00074	0.049
Lindane	NE	0.4	0.4	0.0002	4.0	3.2	–	–	0.30
Methylene chloride	NE	NE	NE	0.005	NE	20	4.3	4.1	7.5

TCLP = Toxicity Characteristics Leaching Procedure, 40 CFR, Part 26.
STLC = Soluble Threshold Limit Concentration, CCR Title 22.
TTLC = Total Threshold Limit Concentration, CCR Title 22.
PRG = Preliminary Remediation Goal (October 1, 1999).
NE = None Established.
MCL = Maximum Contaminant Level based on CCR Title 22 (MCLs will be used to assess groundwater protectiveness based on TCLP and STLC results).
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
µg/L = micrograms per liter.
ppbv = parts per billion by volume.

TABLE 3.2

SUMMARY OF PRELIMINARY CHEMICALS OF CONCERN WITH THEIR RESPECTIVE REGULATORY LIMITS AND INDUSTRIAL CLEANUP GOALS WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

CHEMICAL	1994 WDI ROD STANDARDS (mg/kg)	TCLP Limit (mg/L)	STLC (mg/L)	MCL (mg/L)	TTLC (mg/kg)	INDUSTRIAL PRGs (October 1, 1999)			RESIDENTIAL PRGs
						Soils (mg/kg)	Ground Water/ Tap Water (μg/L)	Ambient Air (ppbv)	Soils (μg/kg)
Methyl Ethyl Ketone (2-Butanone)	NE	200	NE	NE	NE	27,000	1,900	1,000	7,100
2-Methylnaphthalene	NE	NE	NE	NE	NE	–	–	–	–
Naphthalene	NE	NE	NE	NE	NE	190	240	150	190
Pentachlorophenol	NE	100	1.7	0.001	17	15	29	2.9	2.5
Phenanthrene	NE	NE	NE	NE	NE	–	–	–	–
Polychlorinated Biphenyls	0.22	NE	5	0.0005	50	–	0.73	0.073	–
Pyrene	NE	NE	NE	NE	NE	100	180	110	100
Tetrachloroethene	NE	0.7	NE	0.005	NE	16	1.1	3.3	5.4
Toluene	NE	NE	NE	0.15	NE	520	720	400	52
1,1,1-Trichloroethane	NE	NE	NE	0.2	NE	1,400	790	1,000	420
Trichloroethene	NE	0.5	204	0.005	2,040	6.1	16	11	3.2
Vinyl chloride	NE	0.2	NE	0.0005	NE	0.048	0.020	0.010	0.015
Xylene	NE	NE	NE	1,750	NE	370	1,400	730	320

94-256 Rpts/SFS (7/14/00/nm)

TCLP = Toxicity Characteristics Leaching Procedure, 40 CFR, Part 26.
STLC = Soluble Threshold Limit Concentration, CCR Title 22.
TTLC = Total Threshold Limit Concentration, CCR Title 22.
PRG = Preliminary Remediation Goal (October 1, 1999).
NE = None Established.
MCL = Maximum Contaminant Level based on CCR Title 22 (MCLs will be used to assess groundwater protectiveness based on TCLP and STLC results).
mg/kg = milligrams per kilogram.
mg/L = milligrams per liter.
μg/L = micrograms per liter.
ppbv = parts per billion by volume.

TABLE 3.3

TOXICITY VALUES FOR CHEMICALS OF POTENTIAL CONCERN WASTE DISPOSAL, INC. SUPERFUND SITE

CHEMICAL OF POTENTIAL CONCERN	ORAL RfD VALUE (mg/kg-day)	INHALATION RfD VALUE (mg/kg-day)	ORAL SLOPE FACTOR (mg/kg-day^{-1})	INHALATION SLOPE FACTOR (mg/kg-day^{-1})	SOURCES OF RfD AND SLOPE FACTOR	USEPA CANCER CLASSIFICATION
ORGANICS						
Aldrin	3E-05	--	17	17	IRIS/HEA	B2
Benzene	--	--	2.9E-02	2.9E-02	IRIS/HEA	A
Benzene Hexachloride						
Technical grade	--	--	1.8	1.8	IRIS	B2
Alpha-isomer	--	--	6.3	6.3	IRIS	B2
Beta-isomer	--	--	1.8	1.8	IRIS	C
Gamma-isomer	3E-04	--	1.3	--	IRIS	B2
Benzoic acid	4E+00	--	--	--	IRIS	--
2-Butanone	5E-02	9E-02	--	--	IRIS/HEA	--
Carbon tetrachloride	7E-04	--	1.3E-01	1.3E-01	IRIS	B2
Chlordane	6E-05	--	1.3E+00	1.3E+00	IRIS	B2
Chloroform	1E-02	--	6.1E-03	8.1E-02	IRIS	B2
DDT	5E-04	--	3.4E-01	3.4E-01	IRIS	B2
1,2-Dibromoethane	--	--	8.5E+01	7.6E-01	IRIS	B2
1,4-Dichlorobenzee	1E-01	2E-01	2.4E-02	--	HEA	B2
1,2-Dichloroethane	--	--	9.1E-02	9.1E-02	IRIS	B2
Dieldrin	5E-05	--	1.6E+01	1.6E+01	IRIS	B2
Ethylbenzene	1E-01	1E-01	--	--	IRIS	--
Heptachlor	5E-04	--	4.5E+00	4.5E+00	IRIS	B2
Heptachlor Epoxide	1.3E-05	--	9.1E+00	9.1E+00	IRIS	B2
Methylene chloride	6E-02	--	7.5E-03	1.4E-02	HEA	B2
Pentachlorophenol	3E-02	3E-02	1.6E-02	1.6E-02	HEA/Cal EPA	B2
Polychlorinated Biphenyls	--	--	7.7E+00	--	IRIS	B2
Polycyclic Aromatic Hydrocarbons						
Noncarcinogenic	4.1E-01	4.1E-01	--	--	HEA	--
Carcinogenic	--	--	1.15E+01	6.10E+00	HEA	B2
Tetrachloroethane	1E-02	--	5.1E-02	3.3E-03	IRIS/HEA	B2
Toluene	3E-01	1E+00	--	--	IRIS/HEA	--
1,1,1-Trichloroethane	9E-02	3E-01	--	--	IRIS	--
Trichloroethene	7.35E-03	--	1.1E-02	1.3E-02	HEA	B2
Vinyl chloride	--	--	2.3E+00	2.95E-01	IRIS	A
Xylenes	2E+00	3E-01	--	--	HEA	--
INORGANICS						
Antimony	4E-04	4E-04	--	--	IRIS	--
Arsenic	1E-03	--	2.0E+00	5.0E+01	EPA, 1988/IRIS	A
Cadmium			--	--		B1
Drinking water route	5E-04	--	--	6.1E+00	HEA	A
Other routes	1E-03	--	--	--	IRIS/HEA	--
Chromium (III)	1E+00	--	--	4.1E+01	IRIS	--
Chromium (VI)	5E-03	--	--	--	IRIS	--
Copper	4E-02	1E-02	--	--	EPA, 1987	--
Lead	6E-04	6E-04	--	--	--	--
Manganese	2E-01	3E-04	--	--	HEA	--
Mercury, inorganic	3E-04	5E-05	--	--	HEA	--
Mercury, organic	3E-04	1E-04	--	--	HEA	--
Selenium	3E-03	1E-03	--	--	HEA	--
Thallium	7E-05	--	--	--	HEA	--
Zinc	2.1E-01	--	--	--	IRIS	--

94-256/Rpts/SFS (7/14/00/nm)

A = Sufficient evidence of carcinogenicity in humans.
B1 = Limited evidence of carcinogenicity in humans.
B2 = Sufficient evidence of carcinogenicity in animals with inadequate or lack of human data.
C = Limited evidence of carcinogenicity in animals and inadequate or lack of human data.
Cal-EPA = California Environmental Protection Agency.
IRIS = Integrated Risk Information System.
HEA = Health Effects Advisories.
mg/kg-day = daily milligrams per kilogram.
RfD = Reference dose.
-- = No value.
Note: Table provided by EPA on September 16, 1999.

TRC
Customer-Focused Solutions

TABLE 3.4

VALUES USED TO CALCULATE CHRONIC DAILY INTAKE (CDI) WASTE DISPOSAL, INC. SUPERFUND SITE

EXPOSURE ROUTE	PARAMETER CODE	PARAMETER DEFINITION	UNITS	AVERAGE CASE	PLAUSIBLE MAXIMUM	INTAKE EQUATION/ MODEL NAME
CURRENT LAND-USE SCENARIO						
Direct Contact with Soil by Trespassers	CS	Chemical Concentration in Soil	mg/kg	Geometric Mean	Maximum	Intake by ingestion (INTi) = CS x ABS x IRS x Cv
	EF	Exposure Frequency	event/week	1	5	
	ED	Exposure Duration	years	4	6	Intake by dermal contact (INTd) = CS x ABS x SA x Cv
	BW	Body weight	kg	60	60	
	IRS	Soil Ingestion Rate	mg/event	100	100	CDI = [(INTi + INTd) x ED x EF)]/(BW x AT)
	SA	Exposed Surface Area	cm^2	1,400	1,980	
	ABS	Skin Adsorption	unitless	chemical-specific	chemical-specific	
	SC	Soil Contact Rate	mg/cm^2-day	1.45	2.77	
	AT-C	Averaging Time for Carcinogens	days	27,375	75	
	AT-N	Averaging Time for Noncarcinogens	days	=ED x 365	=ED x 365	
	Cv	Conversion Factor	kg/mg	1E-06	1E-06	
Installation of Airborne Particulates and Volatiles by Adult Residents and Students	CA	Chemical Concentration in Air	mg/m^3	modeled conc.	modeled conc.	
	EF (adult)	Exposure Frequency	days/year	330	330	Intake by inhalation (INTa) = CA x IR x EL x ABSi x Cv
	EL (adult)	Exposure Length	hours/day	24	24	
	ED (adult)	Exposure Duration	years	9	30	CDI = (INTa x ED x EF)/ (BW x AT)
	BW (adult)	Body Weight	kg	70	70	
	ABSi	Inhalation Absorption Fraction	unitless	chemical-specific	chemical-specific	
	IR	Inhalation Rate	m^3/day	20	20	
	Cv	Conversion Factor	day/hours	0.042	0.042	
	EF (student)	Exposure Frequency	days/year	180	180	
	EL (student)	Exposure Length	hours/day	8	10	
	ED (student)	Exposure Duration	years	4	6	
	BW (student)	Body Weight	kg	60	60	
FUTURE LAND-USE SCENARIO						
Direct Contact with Soil by Onsite Residents	CS	Chemical Concentration in Soil	mg/kg	geometric mean	maximum	Intake by ingestion (INTi) = CS x ABS x IRS x Cv
	EF (adult)	Exposure Frequency	days/year	240	365	
	ED (adult)	Exposure Duration	year	9	30	Intake by dermal contact (INTd) = CS x ABS x SA x Cv
	BW (adult)	Body Weight	kg	70	70	

TABLE 3.4

VALUES USED TO CALCULATE CHRONIC DAILY INTAKE (CDI) WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

EXPOSURE ROUTE	PARAMETER CODE	PARAMETER DEFINITION	UNITS	AVERAGE CASE	PLAUSIBLE MAXIMUM	INTAKE EQUATION/ MODEL NAME
FUTURE LAND-USE SCENARIO (Cont'd)						
Direct Contact with Soil by Onsite Residents	IRS (adult)	Soil Ingestion Rate	mg/day	100	100	CDI = [(INTi + INTd) x ED x EF]/(BW x AT)
	SA (adult)	Exposed Surface Area	cm^2	1,400	1,980	
	ABS	Skin Absorption	unitless	chemical-specific	chemical-specific	
	SC	Soil Contact Rate	mg/cm^2-day	1.45	2.77	
	AT-C	Averaging Time for Carcinogens	days	27,375	75	
	AT-N	Averaging Time for Noncarcinogens	days	=ED x 365	=ED x 365	
	Cv	Conversion Factor	kg/mg	1E-06	1E-06	
	EF (child)	Exposure Frequency	days/year	240	365	
	ED (child)	Exposure Duration	years	6	6	
	BW (child)	Body Weight	kg	15	15	
	IRS (child)	Soil Ingestion Rate	mg/day	200	800	
	SA (child)	Exposed Surface Area	cm^2	1,400	1,400	
Ground Water Ingestion by Onsite Residents	CW	Chemical Concentration in Ground Water	mg/kg	geometric mean	maximum	
	EF	Exposure Frequency	days/year	365	365	
	ED (adult)	Exposure Duration	years	9	30	CDI = (CW x Ing x ED x EF)/ (BW x AT)
	BW (adult)	Body Weight	kg	70	70	
	Ing (adult)	Ground Water Ingestion Rate	L/day	2	2	
	AT-C	Averaging Time for Carcinogens	days	27,375	75	
	AT-N	Averaging Time for Noncarcinogens	days	=ED x 365	=ED x 365	
	Cv	Conversion Factor	kg/mg	1E-06	1E-06	
	ED (child)	Exposure Duration	year	2	4	
	BW (child)	Body Weight	kg	10	10	
	Ing (child)	Ground Water Ingestion Rate	L/day	1	1	
Inhalation of Contaminants in Indoor Air by Onsite Residents	CA	Chemical Concentration in Air	mg/m^3	modeled conc	modeled conc	
	EF	Exposure Frequency	days/year	365	365	Intake by inhalation (INTa) = CS x IR x EL x ABSi x Cv
	EL	Exposure Length	hours/day	24	24	
	ABSi	Inhalation Absorption Fraction	unitless	chemical-specific	chemical-specific	

TABLE 3.4

VALUES USED TO CALCULATE CHRONIC DAILY INTAKE (CDI)
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

EXPOSURE ROUTE	PARAMETER CODE	PARAMETER DEFINITION	UNITS	AVERAGE CASE	PLAUSIBLE MAXIMUM	INTAKE EQUATION/ MODEL NAME
FUTURE LAND-USE SCENARIO (Cont'd)						
Inhalation of Contaminants in Indoor Air by Onsite Residents	Cv	Conversion Factor	day/hours	0.042	0.042	
	ED (adult)	Exposure Duration	years	9	30	CDI = (INTa x ED x EF)/ (BW x AT)
	BW (adult)	Body Weight	kg	70	70	
	IR (adult)	Inhalation Rate	m^3/day	20	20	
	ED (child)	Exposure Duration	years	2	4	
	BW (child)	Body Weight	kg	10	10	
	IR (child)	Inhalation Rate	m^3/day	5	5	

94-256/Rpts/SFS (7/14/00/rm)

mg/kg = milligrams per kilogram
event/week = event per week
kg = kilograms
mg/event = milligrams per event
cm^2 = square centimeters
mg/cm^2-day = daily milligrams per square centimeter
kg/mg = kilograms per milligram
mg/m^3 = milligrams per cubic meter
days/year = days per year
hours/day = hours per day
m^3/day = cubic meter per day
day/hours = day per hours
L/day = liters per day
mg/day = milligrams per day

Notes: Table provided by EPA on September 16, 1999.

TABLE 3.5

SUMMARY OF POTENTIAL HEALTH RISKS WASTE DISPOSAL, INC. SUPERFUND SITE

EXPOSURE SCENARIO	TOTAL LIFETIME CANCER RISKS		NONCARCINOGENIC HAZARD INDEX (CDI/RfD)	
	Average	Plausible Maximum	Average	Plausible Maximum
CURRENT LAND USE				
Trespassers contacting surface soils	5E-07	3E-05	5E-02	3E+00
Offsite residents inhaling airborne particulates				
-0.1 km	3E-06	8E-06	2E-03	2E-03
-0.5 km	5E-07	2E-06	3E-04	3E-04
-1.0 km	2E-07	8E-07	2E-04	2E-04
Students inhaling airborne particulates	2E-07	4E-07	4E-04	5E-04
Offsite residents inhaling airborne volatile chemicals				
-0.1 km	3E-07	5E-06	2E-06	9E-06
-0.5 km	5E-08	1E-06	4E-07	2E-06
-1.0 km	2E-08	5E-07	2E-07	9E-07
Students inhaling airborne volatile chemicals	3E-08	3E-07	4E-07	3E-06
FUTURE LAND USE				
Onsite Residents contacting soil				
- Adults	3E-06	**7E-04**	2E-01	**1E+01**
- Children	2E-05	**3E-03**	2E+00	**5E+02**
Onsite Residents ingesting groundwater				
- Adults	4E-05	**3E-04**	5E-01	**2E+00**
- Children			**2E+00**	**8E+00**
Onsite Residents inhaling volatile chemicals in indoor air				
- Adults	6E-05	**6E-04**	5E-04	1E-03
- Children			9E-04	3E-03

94-256/Rpts/SFS/Tbls&Figs (7/14/00/rm)

Note: Table provided by EPA on September 16, 1999.
Bold entries exceed EPA's 1 x 10^{-4} risk level using future land use scenario only.

TABLE 3.6

PROVISIONAL SOIL GAS PERFORMANCE STANDARDS
WASTE DISPOSAL, INC. SUPERFUND SITE

CHEMICAL OF CONCERN	1998 EPA AMBIENT AIR PRG (ppbv)	TOXICOLOGICAL BASIS FOR AMBIENT AIR PRG	PROVISIONAL SOIL GAS PERFORMANCE STANDARD (ppbv)	RATIONALE FOR THE DEVELOPMENT OF THE PROVISIONAL SOIL GAS PERFORMANCE STANDARD
1,2-Dichloroethane	0.02	probable carcinogen	20	(PRG at 1E-5 cancer risk level) x (attenuation factor) = 0.2 ppbv x 100
1,1-Dichloroethene	0.01	possible carcinogen	100	(PRG at 1E-4 cancer risk level) x (attenuation factor) = 1 ppbv x 100
1,2,4-Trimethylbenzene	1	noncarcinogenic	100	(PRG at HQ = 1) x (attenuation factor of 100)
1,2-Dichloroethene (cis)	9	noncarcinogenic	900	(PRG at HQ = 1) x (attenuation factor of 100)
1,2-Dichloroethene (trans)	20	noncarcinogenic	2,000	(PRG at HQ = 1) x (attenuation factor of 100)
1,2-Dichloropropane	0.02	probable carcinogen	20	(PRG at 1E-5 cancer risk level) x (attenuation factor) = 0.2 ppbv x 100
1,3,5-Trimethylbenzene	1	noncarcinogenic	100	(PRG at HQ = 1) x (attenuation factor of 100)
Benzene	0.1	known carcinogen	10	(PRG at 1E-6 cancer risk level) x (attenuation factor) = 0.1 ppbv x 100
Chloroform	0.02	probable carcinogen	20	(PRG at 1E-5 cancer risk level) x (attenuation factor) = 0.2 ppbv x 100
Ethylbenzene	250	noncarcinogenic	25,000	(PRG at HQ =1) x (attenuation factor of 100)
Methane	--	--	1.25% (near buildings) 5.0% (site perimeter)	--
Xylenes	200	noncarcinogenic	20,000	(PRG at HQ = 1) x (attenuation factor of 100)
Tetrachloroethene	0.5	probable carcinogen	500	(PRG at 1E-5 cancer risk level) x (attenuation factor) = 5 ppbv x 100
Toluene	100	noncarcinogenic	10,000	(PRG at HQ = 1) x (attenuation factor of 100)
Trichloroethene	0.2	probable carcinogen	200	(PRG at 1E-5 cancer risk level) x (attenuation factor) = 2 ppbv x 100
Vinyl chloride	0.01	known carcinogen	1	(PRG at 1E-6 cancer risk level) x (attenuation factor) = 0.01 ppbv x 100

94-256/Rpts/SFS (7/14/00/rm)

TABLE 3.7

REMEDIAL ACTION OBJECTIVES, GENERAL RESPONSE ACTIONS AND TECHNOLOGY OPTIONS WASTE DISPOSAL, INC. SUPERFUND SITE

MEDIA	REMEDIAL ACTION OBJECTIVES (from site characterization)	GENERAL RESPONSE ACTIONS (for all remedial action objectives)	REMEDIAL TECHNOLOGY OPTIONS (for general response actions)
Ground Water	For Human Health: • Prevent ingestion of water having carcinogen(s) in excess of MCL(s) and a total excess cancer risk (for all contaminants) of greater than 10^{-4} to 10^{-7}. • Prevent ingestion of water having noncarcinogen(s) in excess of MCL(s) or reference dose(s). For Environmental Protection: • Restore ground water aquifer to concentration(s) for contaminant(s).	No Further Action Institutional Controls Collection Treatment and Disposal	No Further Action Institutional Controls • Access Restrictions (e.g., fencing) • Land Use Restrictions • Monitoring • Future Development Requirements Collection Treatment and Disposal
Soil	For Human Health: • Prevent ingestion/direct contact with soil having noncarcinogen(s) in excess of reference dose(s). • Prevent direct contact/ingestion with soil having 10^{-4} to 10^{-7} excess cancer risk from carcinogen(s). • Prevent inhalation of carcinogen(s) posing excess cancer risk levels of 10^{-4} to 10^{-6}. For Environmental Protection: • Prevent migration of contaminants that would result in ground water contamination in excess of concentration(s) for contaminant(s).	No Further Action Institutional Controls Containment Excavation Treatment	No Further Action Institutional Controls • Access Restrictions (e.g., fencing) • Land Use Restrictions • Monitoring • Future Development Requirements Containment • Capping (RCRA or RCRA-equivalent, asphalt, concrete, monofill [soil], evapotranspiration) • Surface Controls Excavation • Onsite Consolidation • Offsite Disposal Treatment • In-situ Treatment Process - Vitrification - Bioventing - Soil Washing - Solidification/Stabilization • Ex-situ Treatment Process - Onsite Treatment and Consolidation/Offsite Treatment and Disposal - Landfarming/Composting - Biotreatment Cells - Soil Washing/Solvent Extraction - Solidification/Stabilization - Thermal Desorption - Incineration

TRC
Customer-Focused Solutions

TABLE 3.7

REMEDIAL ACTION OBJECTIVES, GENERAL RESPONSE ACTIONS AND TECHNOLOGY TYPES WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

MEDIA	REMEDIAL ACTION OBJECTIVES (from site characterization)	GENERAL RESPONSE ACTIONS (for all remedial action objectives)	REMEDIAL TECHNOLOGY OPTIONS (for general response actions)
Soil Gas	For Human Health: • Prevent inhalation of carcinogen(s) in excess of 10^{-4} to 10^{-7} excess cancer risk.	No Further Action Institutional Controls Containment Treatment	No Further Action Institutional Controls • Access Restrictions (e.g., fencing) • Land Use Restrictions • Monitoring • Future Development Requirements Containment • Active/Passive - Vertical and Horizontal Soil Gas Barriers - Vertical Collection Wells • Building Modifications - Monitoring and Controls - Perimeter Gas Collection System - Foundation Venting - Positive Building Pressure - Floor Sealing Treatment • Active/Passive - Bioventing - SVE
Liquids Located Within and Outside the Reservoir Boundary	For Human Health: • Prevent ingestion/direct contact with wastes having 10^{-4} to 10^{-7} excess cancer risk from carcinogen(s). • Prevent migration of carcinogen(s) which would result in ground water concentrations in excess of MCLs or 10^{-4} to 10^{-7} total excess cancer risk levels. For Environmental Protection: • Prevent migration of contaminants that would result in ground water contamination in excess of concentration(s) for contaminant(s).	No Further Action Institutional Controls Collection Containment	No Further Action Institutional Controls • Access Restrictions (e.g., fencing) • Land Use Restrictions • Monitoring • Future Development Requirements Collection • Active - Recovery Wells • Passive - Phytoremediation Containment • Capping (RCRA or RCRA-equivalent, asphalt, concrete, monofill (soil), evapotranspiration)

94-256/Rpts/SFS (7/14/00/rm)

4.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

1. CERCLA requires that the remedy chosen at a Site must attain ARARs unless the basis for a statutory waiver exists. ARARs are standards, criteria, or limits promulgated under federal, state or local laws, and are typically used in development of RAOs and cleanup requirements (40 CFR Part 300.430 [e][2][i]).

2. Applicable requirements are those standards, requirements, criteria or limitations promulgated under federal, state or local environmental or facility siting laws that specifically address a hazardous substance, remedial action or other circumstances at a CERCLA site. Relevant or appropriate requirements are those standards, requirements, criteria or limitations that were not applicable to the Site, but which describe a hazardous substance, remedial action or other circumstance sufficiently similar to the circumstances at the Site such that the requirement is relevant to Site remediation and appropriate for use. In some circumstances a requirement may be relevant but not appropriate. If a determination is made that a requirement is relevant and appropriate, such requirement must be met to the same extent as an applicable requirement.

3. Response actions at a CERCLA Site are required to comply with the substantive requirements of the ARARs selected for the remedy. Pursuant to CERCLA, administrative requirements, including permitting and reporting requirements, are not ARARs and, therefore not required to be met for the onsite portion of a CERCLA response action. An action that takes place offsite is subject to the full requirements of federal, state and local regulations.

4. Nonpromulgated policy, advisories or guidance may be considered when developing remediation levels necessary to protect public health. These items are called "to be considered" (TBC) criteria. Unless they are incorporated in the amended ROD, TBCs are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs may be used in determining the necessary level of cleanup for protection of human health or the environment.

5. EPA has developed three categories of ARARs. These categories are: (1) chemical-specific; (2) action-specific; and (3) location-specific ARARs. EPA recognizes that some requirements may not fall neatly into this classification. The categories are described as follows:

   - Chemical-specific: These ARARs are usually health or risk-based numerical values or methodologies which when applied to site-specific conditions result in the establishment of site-specific values. These values establish the acceptable amount or concentration of chemical that may be found in discharge to the local environment or establish cleanup criteria for contaminants in the environment. Examples of federal chemical-specific requirements include RCRA toxicity characteristics, MCLs and MCL goals and water quality criteria.
   - Action-Specific: Action-specific ARARs are usually technology or activity-based requirements or limitations on actions taken with respect to hazardous substances. RCRA Performance Standards and Land Disposal Treatment Standards are examples of potential action-specific ARARs.
   - Location-Specific: These ARARs are restrictions placed on concentrations of hazardous substances or the location of activities solely because they occur in special locations. Location-specific ARARs relate to the geographical or physical position of the Site (e.g., location near wetlands, endangered species, floodplains, etc.).

6. Section 121(D)(4) of CERCLA provides for the consideration of an ARARs waiver if one or more of the following conditions exist:

   - The remedial action selected is part of the total remedial action that will ultimately attain the standards of control when completed.
   - Compliance with the ARAR may result in a greater risk to human health and the environment.
   - Compliance is technically impractical (TI) from an engineering perspective.
   - The remedial action will attain a standard of performance equivalent to an ARAR (e.g., an action-specific ARAR) through the use of another method.
   - The state has not consistently applied the standard requirement criteria limitations to other similar sites within the state.
   - The ARAR would require too great an expenditure of the Superfund trust fund.

7. The specific requirements that may be applicable or relevant and appropriate for the Site are discussed below. The identification of ARARs is an iterative process. Final ARARs designation will be made by EPA as part of the remedy selection for the new ROD, and will take into account public comment.

4.1 CHEMICAL-SPECIFIC ARARs

1. The potential COCs identified in Section 3.1.2 (see Table 3.1) are the constituents for which chemical-specific ARARs may apply. Chemical-specific ARARs have been identified for the COCs and the chemicals evaluated in the Endangerment Assessment as presented in Section 3.1.2. Chemical-specific ARARs for the various Site media have been identified as shown in Table 4.1.

4.2 ACTION-SPECIFIC ARARs

1. Action-specific ARARs are used to set performance, design or other action-specific controls or restrictions on hazardous substance activities. Because several remedial alternatives are being evaluated for the Site, a variety of requirements must be considered. The preliminary action-specific ARARs are summarized in Table 4.1.

4.3 LOCATION-SPECIFIC ARARs

1. Location-specific ARARs are those requirements that relate to the geographical or physical position of the Site, rather than to the nature of the contaminants or the proposed Remedial Actions. These requirements may limit the type of Remedial Actions that can be implemented and may impose additional constraints on the cleanup activities.

2. Location-specific ARARs differ from chemical-specific or action-specific in that they are not closely related to the characteristics of the waste at the Site or to the specific remedial alternative under consideration. Actions may be required to preserve or protect aspects of the environment or cultural resources of the area that may be threatened by the existence of the Site or by Remedial Actions to be undertaken.

3. Location-specific ARARs for the Site are summarized in Table 4.1.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
CHEMICAL SPECIFIC - WATER QUALITY				
Clean Water Act, 33 USC §1251-1387, and 40 CFR pt. 122, National Pollution Discharge Elimination System, implemented by State Water Resources Control Board Statewide General Permits re Stormwater Discharges, 99-08 (General Construction) and 97-03 (General Industrial)	Establishes the framework for regulations over the control of water pollution and restoration of water resources. Requirements for certain industrial and construction activities to ensure stormwater discharges do not contribute to a violation of surface water quality standards. Includes measures to minimize or eliminate pollutants in stormwater discharges and monitoring to show compliance.	Certain regulations stemming from the Clean Water Act are **Applicable** to water discharges and ground water treatment remedies. Stormwater requirements are applicable to construction of treatment units, if any.	Landfill cover drainage control; surface water discharge and run-off; construction.	Site grading, construction of impermeable cover, O&M, monitoring, and treatment units, if any.
Safe Drinking Water Act, 42 USC §300f-300j-26; Cal. Safe Drinking Water Act, Cal. Health & Safety Code §116270-116751; National Primary Drinking Water Regulations, 40 CFR Part 141; Drinking Water Quality Standards, Title 22, Chapter 15, Art. 5.5, §§64431 and 64444 (Domestic Water Quality and Monitoring Regulations)	Act establishes primary and secondary drinking water standards (Maximum Contaminant Levels) for drinking water supplies. Regulations establish enforceable, maximum permissible levels of biological, inorganic, and organic contaminant concentrations for drinking water. MCLs are health-based standards. Federal regulations establish Maximum Contaminant Level Goals (MCLGs), health goals at which no known health effects would occur.	The regulations are **Relevant and Appropriate** as cleanup standards for aquifer ground water quality. The MCLs and non-zero MCLGs are **Relevant and Appropriate** as aquifer cleanup standards if ground water remediation is required; the MCLs and non-zero MCLGs are **Relevant and Appropriate** to the treatment and discharge of chemicals into existing or potential drinking water supplies, including the ground water at the Site.	Ground water, surface water.	Construction of impermeable cover, O&M, monitoring; potentially extraction and treatment of contaminated ground water and the provision of alternative water supply. Ground water monitoring; site capping.

TRC
Customer-Focused Solutions

(((

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
CHEMICAL SPECIFIC - WATER QUALITY (Continued)				
Porter-Cologne Water Quality Control Act, §13170, 13241; Water Quality Control Plan, Los Angeles Basin, Water Quality Standards	Establishes water quality objectives applicable to waters of the State, including ground water. Establishes ground water monitoring requirements for the saturated and unsaturated zones. Establishes beneficial uses of surface waters. Generally, incorporates state MCLs for ground water contaminants in ground waters designated as drinking water supply; prohibits concentration of constituents in amounts that adversely affect designated beneficial use.	**Applicable** to contaminated perched-liquids and soil/waste contamination that threatens ground water quality; ground water; stormwater run-off.	Ground water, stormwater, liquids.	Construction, O&M of cap, monitoring, liquids recovery, and stormwater management.
State Water Resources Control Board Resolution No. 92-49, Section III.(g)	Requires dischargers to cleanup and abate the effect of discharges in a manner that promotes attainment of background water quality, or the best water quality which is reasonable if background levels are not technically or economically achievable, up to the beneficial use of the water, e.g., to MCLs.	**Relevant and Appropriate** consideration for ground water contamination.	Ground water.	Potentially addressed through ground water remedy and/or monitoring.
CHEMICAL SPECIFIC - AIR QUALITY				
Clean Air Act, 42 USC §7401, et seq.; National Primary and Secondary Ambient Air Quality Standards (NAAQS), 40 CFR §§50.1-50.11; Ambient Air Quality Standards, CCR, Title 17, Div. 3, Ch. 1, Subch. 1.5, Art. 2, §§70101, 70200	Establish Ambient Air Quality Standards for ambient air to protect public health and welfare. Identifies standards for six pollutants.	**Applicable** to emissions, including particulate matter, NO_X and CO emissions, from landfill gas treatment unit.	Soil gas and landfill gas.	Landfill gas emissions control/treatment; emissions controls during cover construction.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
CHEMICAL SPECIFIC - AIR QUALITY (Continued)				
Clean Air Act, 42 USC §7401, et seq.; National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 CFR Part 61; SCAQMD Regulation X (adopting federal standards)	Establishes emission standards for certain particularly hazardous air pollutants.	**Relevant and Appropriate** to landfill gas treatment and soil vapor extraction emissions.	Soil gas.	Emissions controls on landfill gas treatment unit.
Clean Air Act, 42 USC §7401, et seq.; New Source Performance Standards (NSPSs), 40 CFR Part 60; SCAQMD Regulation IX (adopting federal standards)	Establishes standards for new stationary sources of air emissions to ensure that they are designed, equipped, operated, and maintained to reduce emissions to a minimum. The emission control technology on which the NSPSs are based is the best demonstrated technology.	**Relevant and Appropriate** to soil vapor extraction units and the landfill gas treatment units depending on emission rates.	Landfill and soil gas.	Verification that emissions quantities do not trigger levels requiring new source performance review. Air emission equipment will be necessary if exceedances are predicted.
Air Resources Act, Cal. H&S Code, §39000, et seq.; California State Implementation Plan (SIP)	Regulates both nonvehicular and vehicular sources of air pollutants. The SIP describes how the air quality programs of the state will be implemented. The South Coast Air Quality Management District (SCAQMD) is the Air Pollution Control District governing the site.	**Applicable** to landfill gas treatment and soil vapor extraction air discharges. Remedial actions should comply with relevant substantive requirements of the SIP.	Soil, wastes, soil gas, landfill gas.	Addressed through meeting substantive requirements of SCAQMD for emissions discharges from landfill gas collection system or SVE units.
CHEMICAL SPECIFIC - WASTE DELINEATION AND MANAGEMENT				
Toxic Substances Control Act, 15 U.S.C. §§2601-2692; 40 CFR §§761.50-761.79	Establishes means for storage and disposal of material contaminated with polychlorinated biphenyls (PCBs) of concentrations of 50 parts per million or greater.	**Applicable** to the storage and disposal of liquid, wastes and soils containing PCBs at concentrations greater than 50 ppm.	Liquids, wastes, soils.	Addressed through chemical characterization of liquids, wastes, and soils prior to disposal and treatment, and through their disposal and treatment.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
CHEMICAL SPECIFIC - WASTE DELINEATION AND MANAGEMENT (Continued)				
Resource Conservation and Recovery Act, Public Law No. 94-580, 90 Stat. 2795, 42 U.S.C. §6901, et seq.; Hazardous Waste Control Act, Div. 20, Ch. 6.5, §25100, et seq., Criteria for Identifying Hazardous Wastes, CCR Title 22, Div. 4.5, Chapter 11, §§66261.1-66261.126	Establishes criteria and methods for characterizing hazardous wastes.	**Applicable** to the characterization of contaminated soils, wastes, and liquids.	Soil, liquids, liquids treatment residue, waste, soil gas treatment residue.	Characterization of wastes, soils, and liquids.
CHEMICAL SPECIFIC - LANDFILL GASES				
Gas Monitoring and Control During Closure, 27 CCR §20921	Requires control landfill gas as follows: a. Methane concentration must not exceed 1.25 percent by volume in air in onsite structures. b. Methane concentration must not exceed 5 percent by volume in air at property boundary or alternate boundary.	**Relevant and Appropriate** as standards for control of methane.	Soil gas.	Through monitoring and application of landfill gas control measures.
LOCATION SPECIFIC - ENDANGERED SPECIES AND MIGRATORY BIRDS				
Migratory Bird Treaty Act, 16 U.S.C. §703-712.	Migratory Birds must be protected from poisoning at hazardous waste sites.	**Applicable** to migratory birds. Certain bird species, including doves, have been observed at the Site and may be subject to this Act.	Soil, landfill cover, construction.	Construction of remedy and remedy must not expose migratory birds to hazardous materials.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
LOCATION SPECIFIC - ENDANGERED SPECIES AND MIGRATORY BIRDS (Continued)				
Endangered Species Act, 16 USC §§1531-1534; Protection of Endangered and Threatened Species, 50 CFR parts 200 and 402; 40 CFR §6.302(h); California Endangered Species Act, California Fish and Game Code §2050-2098	Imposes limits on agency action that may jeopardize endangered or threatened species or adversely modifies their habitat. Requires consultation with the Department of Fish and Wildlife or California Department of Fish and Game if listed species or habitat may be affected. Requires consideration of mitigation measures.	**Applicable** if endangered or threatened species or their habitat are present at the Site. At this time, it appears that no endangered or threatened species or their habitat are present. Habitat is unlikely to be created during construction of the remedy.	Soil, landfill cover, construction.	Construction; confirm absence of endangered species with state and federal resource management agencies; Consultation with California Resource Management agency to confirm absence of endangered species.
LOCATION SPECIFIC - LAND USE				
Archaeological and Historic Preservation Act, 16 USC §§469, et seq.; 36 CFR Part 65	Requires action to recover and preserve artifacts if alteration of terrain may threaten significant scientific, prehistoric, historic, or archaeological data.	**Applicable** if action is taken in area which may cause irreparable harm, loss or significant destruction of artifacts. These requirements must be considered if artifacts are discovered or appear likely to be discovered during any excavation or drilling.	Soils, landfill cover	If artifacts are discovered during excavation and drilling, substantive requirements must be complied with.
Postclosure Land Use, 27 CCR §21190	Provides for postclosure design and construction requirements for buildings on site and within 1,000 feet of waste holding area.	**Relevant and Appropriate** for redevelopment and reuse.	Landfill cover, wastes, gases.	Through design of cover and control systems, future land use, and enforcement of institutional and engineering controls.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - WASTE MANAGEMENT				
Use and Management of Containers, 22 CCR 66264.170-66264.178	Establishes storage requirements for hazardous waste in containers.	**Relevant and Appropriate** to solids and liquids collected and contained on site prior to offsite transport and disposal.	Soil, wastes, liquids, soil gas treatment residue.	Through design, construction and operation of landfill containment system and management of liquids and other wastes on site.
Standards Applicable to Generators of Hazardous Waste, CCR Title 22, Div. 4.5, Chapter 12, §§66262.10-66262.89	Establishes requirements for generators of hazardous waste, including requirements for waste determination, packaging, labeling, accumulation, and documentation.	**Applicable** to generation of hazardous waste, including soils excavation and liquids extraction, and to landfill operations and maintenance.	Soil, liquids, waste.	Addressed through management and documentation of all hazardous wastes and materials containing hazardous wastes collected, treated, and disposed of as part of the landfill closure action.
Land Disposal Restrictions, CCR Title 22, Div. 4.5, Chapter 18, §66268.1, et seq.	Prohibits land disposal of contaminated wastes and establishes concentration limits and treatment criteria for the land disposal of hazardous wastes.	**Applicable** to excavated soil, extracted liquids, and other wastes exceeding threshold levels requiring treatment prior to disposal offsite. Potentially **Applicable** to onsite disposal, unless either RCRA Corrective Action Management Unit/ Superfund "Area of Contamination" approach is involved.	Soils, liquids, wastes.	Addressed through chemical testing of wastes and comparison of results with waste determination limits, and through compliance with treatment requirements and disposal limitations.
Transportable and Fixed Treatment Unit, CCR Title 22, Div. 4.5, Chapter 45, §67450.3	Describes substantive requirements for transportable and fixed treatment SVE units.	**Applicable** to landfill gas treatment unit and portable soil vapor extraction treatment units.	Soil gas.	Addressed through meeting substantive requirements for air emission.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE				
RCRA Closure and Postclosure for Landfill closures, 22 CCR §66264.111-66264.120	Establishes closure requirements for landfills, surface impoundments, and waste piles.	**Relevant and Appropriate** to the closure of landfill with wastes left in place.	Soil, wastes, liquids.	Through design and construction of landfill containment system.
Corrective Action Waste Management Units, 22 CCR §§66264.552, 6624.553	Establishes that consolidation and placement into a corrective action management unit of remediation wastes generated as part of a corrective action does not constitute placement or land disposal of hazardous waste. Prohibits creation of an unacceptable risk to humans and the environment resulting from exposure. Establishes closure and other requirements. Establishes requirements for temporary tank and container storage.	**Relevant and Appropriate** for the excavation and consolidation of outlying wastes into the central portion of the site to reduce area affected by wastes. The final cover and control systems containing consolidated wastes must meet the landfill closure ARARs.	Wastes, soils. Container requirements relate to extracted liquids and liquid and soil gas treatment residue.	Addressed through design and construction of remedy, including management and consolidation of wastes and soils, and cap construction. Extracted liquids and liquid and soil gas treatment residue must meet container requirements.
Solid Waste Management Act of 1972, CCR, Title 27, Section 20919, Gas Control	Requires monitoring and gas control when landfill decomposition gases may present a hazard or nuisance.	**Relevant and Appropriate** to monitoring and applicable control measures for methane and hazardous gas generated at the site.	Soil gas.	Through site-wide monitoring program and implementation of any necessary gas control measures.

TRC
Customer-Focused Solutions

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE (Continued)				
Gas Monitoring and Control during Closure and Postclosure, CCR Title 27, Section 20921, Gas Monitoring and Control During Closure	Requires control of trace gases to prevent adverse acute and chronic exposure to toxic and/or carcinogenic compounds. Requires closure and postclosure activities to continue for 30 years or until authorized to discontinue. Requires modification of systems to reflect changing land uses. Postclosure land use must not interfere with gas monitoring and control system function.	**Relevant and Appropriate** to hazardous disposal sites that did not commence complete closure by August 18, 1989.	Soil Gas.	Through continuation of site-wide monitoring program and implementation of necessary gas control measures.
Monitoring during Closure and Postclosure, 27 CCR §20923	Requires landfill gas monitoring system to ensure requirements of section 20921 are met Requires monitoring system to be designed to detect gas migrating beyond landfill property boundary and into onsite structures and to account for: • Local soil and rock conditions • Hydrogeological conditions. • Locations of buildings, structures, and waste area • Adjacent land use and inhabitable structures within 1,000 feet of disposal site property boundary. • Man-made pathways • Nature, age and gas generation potential of waste.	**Relevant and Appropriate** to the design and maintenance of the landfill gas monitoring system	Soil gas.	Through application of these requirements into the monitoring program.

TRC
Customer-Focused Solutions

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE (Continued)				
Perimeter Monitoring during Closure and Postclosure, 27 CCR §20925	Requires landfill gas monitoring network around waste deposit perimeter and disposal site boundary, unless certain conditions are met Specifies location, spacing, depth, and construction of soil gas monitoring wells, including: • Location around perimeter • Spacing not to exceed 1,000 ft • Probe at 5 to 10 ft • Probe at mid-depth of waste • Probe at waste depth • Construction as specified.	**Relevant and Appropriate** to monitoring of soil gas.	Soil gas.	Through design and implementation of soil gas monitoring system.
Structure Monitoring during Closure and Postclosure, 27 CCR §20931	Requires monitoring inside buildings and of onsite structures such as vaults where gases can buildup, both adjacent to and on top of waste deposit area. Requires that structures on top of waste be monitored continually.	**Relevant and Appropriate** to monitoring of soil gas adjacent and within buildings.	Soil gas; indoor air.	Through design and implementation of indoor air and near building soil gas monitoring.
Monitoring Parameters during Closure and Postclosure, 27 CCR §20932	Requires sampling of monitoring probes and onsite structures for methane and for trace gases that may pose acute or chronic exposure risk due to toxic or carcinogenic compounds.	**Relevant and Appropriate** to identification of soil gas and indoor air monitoring parameters, and to the sampling of soil gas and indoor air.	Soil gas; indoor air.	Through design and implementation of indoor and near building soil gas monitoring.
Monitoring Frequency during Closure and Postclosure, 27 CCR §20933	Requires monitoring quarterly, or more frequently if gas migration is occurring or other factors are met	**Relevant and Appropriate** to the monitoring frequency for in building and soil gas.	Soil gas; indoor air.	Through design and implementation of indoor and near soil gas monitoring.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE (Continued)				
Landfill Gas Control, 27 CCR §20937	When gas monitoring results show methane is exceeding the levels established in Section 20921, requires taking of all steps necessary to protect public health, safety, and the environment. Also requires the design and construction of a gas control system to: a. Prevent methane accumulation in onsite structures. b. Reduce methane at property boundary to below compliance levels. c. Reduce trace gases. d. Collect and treat landfill gas condensate. Requires mitigation of the effects of landfill gas accumulation if methane in onsite structures exceeds 1.25 percent Requires a system for monitoring and adjustment to assure optimum operating efficiency.	**Relevant and Appropriate** to design and operation of landfill gas control system.	Soil gas, indoor air.	Through design, construction, and operation of gas control system addressing these requirements.
Dust Control for Landfill and Disposal Sites, 27 CCR §20800	Requires the operator to take adequate measures to minimize the creation of dust.	**Relevant and Appropriate** for the construction and maintenance of the landfill cover.	Soil, wastes.	Addressed through dust control measures during construction and maintenance of cover.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE (Continued)				
Drainage and Erosion Control, 27 CCR §21150	Requires drainage and erosion control systems to prevent contact with waste and to ensure integrity of land use and monitoring and control systems.	**Applicable** for landfill postclosure design and maintenance.	Soil, surface water, liquids control, cover.	Addressed through design and postclosure maintenance of cover and drainage systems.
Grading of Fill Surface at Landfill and Disposal Sites, 27 CCR §20650	Requires grading of disposal area covered surfaces to promote lateral run-off of precipitation and to prevent ponding. Requires grades to be established with sufficient slope to account for future settlement.	**Relevant and Appropriate** to landfill cover maintenance.	Soil, surface water, liquids control	Addressed through design and postclosure maintenance of cover and drainage systems.
Security at Closed Sites, 27 CCR §21135	Requires site security, including signs and restriction of access to closed landfill sites to protect public health and safety.	Certain parts of the regulation are potentially **Relevant and Appropriate** to operations and maintenance of closed landfill, depending on the postclosure land use.	Soil, waste.	Addressed through implementation of security measures during postclosure period, depending on postclosure land use.
Final Cover Standards, 27 CCR §21140	Requires final cover to protect human health and safety by controlling landfill gas migration and other factors. Requires final cover to be compatible with postclosure land use. Cover must meet requirements of 27 CCR §21090 (addressed below); alternative cover must comply with 40 CFR §258.6(b).	**Applicable** for design and construction of the landfill cover and the management of landfill gas.	Soil, waste, soil gas.	Addressed by incorporation of standards into design of cover and gas management system and adherence to standards during construction and maintenance.

TRC
Customer-Focused Solutions

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE (Continued)				
Postclosure Land Use, 27 CCR §21190	Requires postclosure land use to protect the cover and gas monitoring systems and prevent public contact with the wastes, gas, and leachate. Addresses design of postclosure land uses, including onsite construction, and requires all such construction to maintain integrity of cover and control system. Establishes additional requirements for construction.	**Relevant and Appropriate** to postclosure land use and to design, construction, and maintenance of cover.	Wastes, leachate, landfill gas, cover systems.	Through incorporation of these requirements into the design, construction, and maintenance of the structures proposed as part of postclosure land uses.
Final Grade, 27 CCR §21142	Provides requirements regarding the final grades for covered landfills.	**Applicable** to design and maintenance of the landfill cover.	Soil, waste, cover.	Addressed through a design that incorporates the grading criteria and construction of the cover to meet the design criteria.
Slope Stability (Final Site Face), 27 CCR §21145	Requires design of the slope stability of the final site face to provide for the integrity of the cover under both static and dynamic conditions.	**Applicable** to design, construction, and maintenance of the final landfill cover.	Soil, waste, cover.	Addressed through design and construction of cover to meet criteria.
Landfill Gas Control and Leachate Contact Prevention, 27 CCR §21160	Requires implementation and maintenance of landfill gas control and leachate contact prevention system.	**Applicable** to design, construction, and maintenance of gas control and cover.	Gas, liquids, cover.	Addressed through design, construction, and implementation of cover and gas control system.
Leachate Collection and Removal Systems, 27 CCR §20340	Requires leachate collection and removal system; design must ensure that there is no buildup of hydraulic head on liner, and that the fluid in the collection sump be kept at the minimum needed to ensure efficient pump operations.	**Relevant and Appropriate** to design, construction, and operation of leachate removal system and cover.	Liquids, cover.	Addressed through design, construction, and implementation of cover and leachate collection system.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE (Continued)				
Precipitation and Drainage Controls, 27 CCR §20365	Requires cover to be graded to divert precipitation, prevent ponding, resist erosion, and control run-off and run-on.	**Relevant and Appropriate** to design, construction, and maintenance of the final landfill cover.	Soil, waste, surface water quality.	Addressed through design and construction of cover to meet criteria.
General Criteria for Waste Management Units and Containment Structures, 27 CCR §§20310(d), 20320, 20360	Establishes requirements containment structures, including materials, testing, and hydraulic conductivity. Requires existing landfills to be fitted with subsurface barriers, as needed and feasible. Establish standards for construction of any subsurface barriers, including grout curtains and cutoff walls.	**Relevant and Appropriate** to leachate, run-off, and gas control measures.	Wastes, soil, leachate/liquids and run-off.	Addressed through construction of barriers, if needed and feasible.
Vadose Zone Monitoring, 27 CCR §20415(d)	Requires vadose zone monitoring for waste constituents for early detection of releases from a landfill.	**Relevant and Appropriate** to postclosure monitoring of closed landfill.	Wastes and leachate (liquids).	Address through implementation of postclosure monitoring program for vadose zone liquids.
Postclosure Care and Use of Property, 27 CCR §21180	Establishes requirements for post-closure maintenance to ensure integrity of final cover and environmental control systems. Requires monitoring and establishes a post-closure care period necessary to protect human health and the environment.	**Applicable** to post closure use of the closed landfill and maintenance of control systems.	Wastes and soil gas.	Addressed through development and adherence to a post closure plan that addresses compatible post closure uses, and through operation and maintenance of cover and control systems.

TRC
Customer-Focused Solutions

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - LANDFILL CLOSURE (Continued)				
Closure and Postclosure Care, 22 CCR §66264.310	Establishes requirements for design, construction, and maintenance of cover, maintenance and monitoring programs, leachate collection and removal, ground water monitoring, and leak detection, gas control and treatment.	**Relevant and Appropriate** to design, construction, and O&M of landfill containment systems.	Waste, leachate (liquids), and soil gas.	Addressed through design, construction, and O&M of control systems.
Seismic Design Standards, 22 CCR §66264.25(b)	Requires cover and cover systems and all containment and control features remaining after closure to withstand the maximum credible earthquake without decreasing environmental and public health protection.	**Relevant and Appropriate** to design of cover and cover systems.	Wastes, cover, cover systems.	Through design, construction, and maintenance of cover.
Closure and Postclosure Maintenance requirements for Disposal Site and Landfills 27 CCR §21090	Establishes requirements for final cover, leak detection, cover repair, hydraulic conductivity, leachate and gas control, leachate removal, ponding prevention, drainage and run-off control, cover surveys, grading; establishes postclosure duties, including monitoring of ground water and surface water.	**Applicable** to design of landfill cover and control systems, and to O&M .	Wastes, liquids, soil gas, ground water.	Through design of cover, control, and O&M addressing these items.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - WATER QUALITY				
Water Quality Monitoring Requirements for Permitted Facilities, CCR Title 22, Div. 4.5, Chapter 14 Article 6, §§66264.95, 66264.97, 66264.98, 66264.99	Establishes requirements, including point-of-compliance boundary, for ground water monitoring for landfills, surface impoundments, waste piles, and land treatment units to attain compliance with water quality protection standards.	**Relevant and Appropriate** to the ground water monitoring effort for wastes left that in place or derived from waste in place.	Wastes, ground water.	Addressed through postclosure ground water monitoring (sampling and analysis) program, including identification of points of compliance, monitoring period, monitoring requirements, detection evaluation, and Corrective Action considerations.
Ground water Monitoring, 27 CCR §§20405, 20415-20430	Establishes general requirements for water quality monitoring system, including background monitoring, for ground water, surface water, and vadose zone.	**Relevant and Appropriate** to postclosure monitoring of ground water and vadose zone.	Ground water.	Addressed through development and implementation of a ground water and vadose zone monitoring program.
Porter-Cologne Water Quality Control Act, Cal. Water Code §§13000, 13140, 13240; State Water Resources Control Board Resolution No. 88-63, "Sources of Drinking Water Policy"; Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan)	Establishes that virtually all ground water and surface waters are considered suitable, or potentially suitable, for municipal or domestic water supply.	**Applicable** to determining beneficial uses for waters affected by waste discharges. Ground water at the Site is considered a source of drinking water.	Ground water.	Potentially through extraction and treatment of ground water.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - WATER QUALITY (Continued)				
State Water Resources Control Board Resolution 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California"	Requires discharges to existing high quality waters to meet waste discharge requirements which will result in the best practicable treatment or control of the discharges necessary to prevent pollution or nuisance and to maintain the highest water quality consistent with the maximum benefit to the people of the state.	**Relevant and Appropriate** to ground water remedies where ground water quality is affected or threatened.	Liquids, ground water.	Addressed through employment of demonstrated remedial measures that protect water resources to the practical extent possible.
Air Resources Act Health & Safety Code/ Title 17, Div. 26, Part III, §39000, et seq./ South Coast Air Quality Management District Rules				
Visible Emissions, Rule 401	Prohibits discharge of air contaminants based on "darkness in shade," measured by the Ringleman chart.	**Applicable** to drilling, excavation, cap, treatment systems, construction, and exhaust from construction equipment and asphalt equipment.	Soils, wastes, cap, and construction equipment emissions.	Addressed through employment of dust control measures during drilling, excavation, earth moving, and placement of final soil cover, and through control of construction equipment exhaust and treatment systems emissions.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT[1]	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - AIR QUALITY				
Nuisance, Rule 402	Prohibits discharge of air contaminants or other materials which cause injury, detriment, nuisance, or annoyance, which endanger comfort, repose, health or safety, or which cause or may cause injury or damage to business or property.	**Applicable** to drilling, excavation, cap, treatment systems, construction, and exhaust from construction equipment and asphalt equipment.	Soils, wastes, cap, and construction equipment emissions.	Addressed through employment of dust control measures during drilling, excavation, earth moving, and placement of final soil cover, and through control of construction equipment exhaust and treatment systems emissions.
Fugitive Dust, Rule 403	Limits onsite activities so that the concentration of fugitive dust at the property line will not be visible. Requires use of best available control measures to minimize fugitive dust emissions.	**Applicable** to drilling, excavation, cap, construction, and exhaust from construction equipment and asphalt equipment.	Soils, wastes, cap, and construction equipment emissions.	Addressed through employment of dust control measures during excavation, earth moving, and placement of final soil cover.
Particulate Matter (Concentration), Rule 404	Prohibits discharge of particulate matter exceeding specified concentrations. Prohibits discharge of discharge gas above concentration limits.	**Applicable** to excavation of soils and wastes, drilling, construction.	Soil, waste, cap.	Addressed through employment of dust control measures during excavation, earth moving, and placement of final soil cover and during drilling and construction.
Solid Particulate Matter, Rule 405	Prohibits discharge of solid particulate matter exceeding specified weights and rates.	**Applicable** to excavation of soils and wastes, drilling, construction.	Soil, waste, cap.	Addressed through employment of control measures during excavation, earth moving, and placement of final soil cover and during drilling and construction.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR
SUPPLEMENTAL FEASIBILITY STUDY
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - AIR QUALITY (Continued)				
Liquid and Gaseous Air Contaminants, Rule 407	Limits carbon monoxide emissions from equipment to 2,000 parts per million (ppm) by volume and sulfur dioxide emissions from equipment to 500 ppm by volume, both averaged over 15 minutes.	**Applicable** to operation and maintenance of landfill gas treatment system.	Soil gas, treatment equipment.	Addressed through calculations of emissions quantities and comparison of quantities with standards. Air emissions equipment will be necessary if exceedances are predicted.
Circumvention, Rule 408	Restricts the concealing of air emissions without accomplishing a reduction in total emission of air contamination.	**Applicable** to operations and maintenance of landfill gas treatment unit and other equipment.	Soil gas, equipment.	Addressed through use of appropriate equipment that minimizes air emissions.
Combustion, Rule 409	Limits discharge of combustion contaminants resulting from fuel burning; does not apply to emissions from internal combustion engines.	**Applicable** to any fuel burning activities other than those from internal combustion engines.	Equipment and treatment systems.	Addressed through use of appropriate equipment that minimizes air emissions from any fuel burning.
Disposal of Solid and Liquid Waste, Rule 473	Imposes restrictions on emissions from the burning of combustible refuse.	**Applicable** to any burning of combustible refuse.	Treatment systems and equipment.	Addressed through use of appropriate equipment that minimizes air emissions from any burning of combustible refuse.
Emulsified Asphalt, Regulation 1108.1	Prohibits sale or use of emulsified asphalt exceeding specified limits.	**Applicable** to the any alternatives using asphalt in the construction and maintenance of the cover.	Asphalt cover.	Through placement of cover using materials as specified.
Excavation of Landfill Site, Regulation 1150	Requires planning, including for mitigation measures to prevent public nuisance.	Substantive requirements are **Relevant and Appropriate** to excavation.	Soils, wastes.	Addressed through planning for and use of appropriate control measures and equipment that minimizes air emissions.

TRC
Customer-Focused Solutions

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ACTION SPECIFIC - AIR QUALITY (Continued)				
VOC Emissions from Decontamination of Soil, Rule 1166.	Imposes requirements for emissions from soils contaminated with VOCs at levels of 50 ppm or greater which are being remediated or encapsulated. If soils are being treated, requires collection of VOCs or equivalent VOC-contaminated soil measure. Prohibits spreading of VOC-contaminated soil resulting in uncontrolled evaporation of VOCs to the atmosphere.	Substantive requirements are potentially **Applicable** to excavation of soils and wastes.	Soils and wastes.	Through control of emissions from excavated soils and wastes.
TO BE CONSIDERED CRITERIA				
USEPA Region IX Preliminary Remediation Goals	PRGs are risk-based concentrations evaluated and established at a 1×10^{-6} target level for carcinogens and at a Hazard Index of less than or equal to 1 for noncarcinogens. Soil PRGs can be considered as a soil cleanup standard when no promulgated standard exists.	PRGs are **TBC** soil cleanup criteria for the Site. The USEPA has determined that the site conditions at the site meet the assumptions used by EPA in developing the PRGs.	Soil, wastes.	Addressed by using the PRGs as a basis for soil and ground water cleanup or providing means such as cover, fencing, or institutional controls that prevents exposure to contaminants exceeding the PRG levels.
USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards	The provisional indoor air and soil gas provisional standards are risk-based concentrations of gaseous contaminants derived from breathing air PRGs.	The provisional standards are **TBC** criteria for addressing soil gas migration, soil gas concentrations near buildings, and indoor air affected by site soil gas contaminants.	Soil gas.	Addressed through subsurface soil actions (e.g., SVE, barrier systems, venting) and/or building modifications that prevents migration of soil gas into structures at concentrations exceeding the standards.

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

REQUIREMENT AND CITATION	SCOPE	COMMENT(1)	APPLICABLE MEDIA	RETAINED FOR FURTHER REMEDIAL ANALYSIS
TO BE CONSIDERED CRITERIA (Continued)				
EPA Policy, Area of Contamination Concept, as articulated in Memo, Use of Area of Contamination Concept during RCRA Cleanups (Mar. 13, 1996); and National Contingency Plan (NCP), 55 Fed. Reg. 8758-8760 (Mar. 8, 1990)	Establishes that consolidation and in-situ treatment of hazardous waste within an "area of contamination" does not trigger land disposal restrictions or minimum technology requirements.	The policy is a **TBC** for alternatives involving excavation and consolidation of soils and waste.	Soil, wastes.	Addressed through design and construction of remedy, including excavation and consolidation of wastes and soils, and cap construction.
EPA Technical Guidance Document, "Final Covers on Hazardous Waste Landfills and Surface Impoundments"	These guidelines recommend a multilayer cover consisting of the following layers from top to bottom: - Vegetation/soil: 60 cm (2 ft.) - Filter: (nominal thickness) - Drainage: 30 cm (1 ft.) - Low permeability flexible membrane liner: 20 mil (min.) - Low permeability soil: 60 cm (2 ft) Plus optional layers.	A **TBC** for the design, construction, and maintenance of the landfill cover.	Cap or landfill cover.	Addressed through construction of cap and cover.

94-256/Rpts/SFS (6/16/00/mc)

Abbreviations used in this Table:

CCR	=	California Code of Regulations
CERCLA	=	Comprehensive Environmental Response, Compensation, and Liability Act, as amended
CFR	=	Code of Federal Regulations
EPA	=	United States Environmental Protection Agency
NCP	=	National Contingency Plan
NSPSs	=	New Source Performance Standards
RCRA	=	Resource Conservation and Recovery Act, as amended
RWQCB	=	Regional Water Quality Control Board
SCAQMD	=	South Coast Air Quality Management District

TABLE 4.1

DRAFT
FEDERAL AND STATE OF CALIFORNIA POTENTIAL ARARs FOR SUPPLEMENTAL FEASIBILITY STUDY WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

USC	=	United States Code
PCB	=	Polychlorinated Biphenyls
PRG	=	Preliminary Remediation Goal
ppm	=	parts per million
TBC	=	To Be Considered Criteria

* Only the substantive, and not the administrative, requirements of the identified laws and regulations are potentially Applicable or Relevant and Appropriate. The requirements, standards, and limitations identified in this table are potentially ARAR for this Site; EPA will make the final determination of the ARARs for this Site in the Amended Record of Decision.

5.0 IDENTIFICATION AND PRELIMINARY SCREENING OF REMEDIAL RESPONSE MEASURES AND TECHNOLOGIES

1. The next step in the FS process is to identify remedial technologies and process options for each GRA in accordance with applicable EPA guidance under CERCLA (EPA, 1988). Potential remedial technologies identified and screened were gathered from EPA; various research; and private industry documents. Experts in various fields of remedial technologies from both the government and the private sector were consulted concerning the appropriateness of technologies for the Site. GRAs are based on the physical conditions of the Site. The COCs identified and other background information are presented in Chapters 2.0 and 3.0.

2. Preliminary screening is performed to eliminate remedial technologies that are not technically implementable, as stated in EPAs Interim Final RI/FS Guidance (EPA, 1988). This screening process is necessary to allow subsequent detailed and focused assessment of the more promising technologies.

3. The technologies, processes and approaches identified within each GRA were screened for potential applicability to the Site using the following criteria:[4]

   - **Effectiveness**: short-term and long-term protectiveness of human health and the environment. This criterion includes consideration of: (1) potential health risks during the short-term implementation of the remedy; (2) short-term and long-term reliability of the technology in treating or containing Site COCs; and (3) the degree to which the TMV of COCs are reduced.
   - **Implementability**: technical and administrative feasibility of implementing technology. Technical feasibility includes the ability to construct, operate and maintain the technology. Administrative feasibility pertains to the ability to obtain agency approvals and permits, and the availability of equipment, technical and management expertise to implement the technology.
   - **Cost**: typically presented as low, moderate or high for each technology category. Where possible, actual Site-specific cost may be included.

(4) EPA. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. 1988.

4. Sections 5.1 through 5.5 present the technology types and process options for the following media:

- Soils.
- Soil gas.
- Ground water.
- Liquids located within and outside the reservoir boundary.
- Indoor air.

A summary of the various GRAs, technologies and process options are summarized in Tables 5.1 through 5.5.

5.1 SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOILS

1. A large number of remedial technologies and associated process options are available for the treatment of soils (e.g., buried waste). The following GRAs were considered for Site soils:
   - Institutional controls.
   - Containment.
   - Excavation.
   - Treatment.

2. **No Further Action**: Although the No Further Action alternative is not considered a technology, under the NCP it is required to be considered in part of the FS process to provide a reference point for comparison of the additional protection and cost of other remedial response measures. The No Further Action alternative has therefore been included in this section as a reference point to compare with other remedial technologies.

3. **Institutional Controls**: Institutional controls protect human health by preventing exposure to buried waste through implementation of restrictions on use of property by owners via: (1) The recordation of restrictive covenants, easements and servitudes; (2) Implementation of local governmental land use or zoning restrictions; and (3) Restricting physical access to property by controls such as signs. The restrictions in 1 and 2 above can be applied to individual Site parcels to limit activities by the property owners, such as restricting subsurface disturbance or other interference with selected remedial alternatives, prohibiting future residential developments, and limiting future use of ground water.

4. **Containment**: Containment measures prevent potential exposure to COCs in the buried waste. Containment measures usually refer to physical barriers that cover, seal or otherwise isolate localized areas.

5. **Excavation**: Excavation of buried waste removes soils with COCs at significant concentrations. Soil removal followed by treatment, consolidation and/or disposal is a remediation method that could occur at the Site. Excavation includes scraping, cutting, digging or scooping. In some cases, e.g., a 2:1 Horizontal:Vertical (H:V) slope of soils adjacent to buildings, the use of shoring or condemnation of buildings, could be required to allow complete excavation. Consolidation would require the excavation and relocation of the buried waste to an existing area which contains waste (e.g., reservoir), without treatment.

6. **Treatment**: Soils could be treated either onsite or offsite to reduce the TMV of the contaminants in the soil and to meet FS objectives. The treated material could be returned to the excavation area as backfill and/or disposed offsite, as appropriate.

7. An evaluation and screening of each of these GRAs in terms of the effectiveness, implementability and cost criteria is provided below and summarized in Tables 5.6 through 5.9.

5.1.1 NO FURTHER ACTION

1. Although not considered a remedial technology, the alternative has been included here for comparison purposes. No Further Action, as presented, implies that further Remedial Actions would not be taken.

2. The No Further Action alternative, as required by the NCP, must be considered in the Remedial Action evaluation and is retained to provide a basis for comparison with other actions. This alternative consists of no additional soil remedial activities at the Site. Monitoring of Site conditions such as erosion or subsidence has been included as a component to document the conditions, to record that existing risk levels remain the same to prevent unacceptable future risks.

3. To determine the applicability of the No Further Action alternative, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost:

    - **Effectiveness**: The No Further Action GRA would not be effective in preventing future direct exposure to COCs in soils. It would not reduce the TMV of COCs nor be effective in mitigating the risk of indirect exposure to COCs. Current and future risks would not be decreased.

- **Implementability**: The No Further Action response is implementable.
- **Cost**: The No Further Action GRA would have a substantially low cost, but is not considered cost-effective, since future risk levels remain unchanged.

5.1.2 INSTITUTIONAL CONTROLS

1. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:
   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.
   - Local governmental zoning and land use controls. Examples of these types of controls could include:
     - Zoning restricts land use to commercial/industrial land use.
     - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
     - Requiring the landowner to obtain approval for building or Site modifications from EPA, the Department of Toxic Substances Control (DTSC), and Site custodian.
   - Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
     - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site

characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.

- Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.

- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:

   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - California Health and Safety Code (CHSC) Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - California Civil Code (CCC) Sections 1457-1471, with specific reference to restrictive environmental covenants.

   The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

3. The United States has the authority under CERCLA 104(j) to acquire property, or interests in property, that the President in his/her discretion determines is needed to conduct a CERCLA Remedial Action. Prior to exercising this authority, the state in which property is located must assure the United States, e.g., through a contract or other cooperative agreement, that it will accept transfer of the property interest following completion of the Remedial Action.

4. CHSC Sections 25220-25241 provide administrative procedures to obtain restrictive environmental covenants, easements and servitudes for use at hazardous waste sites and at buffer zones around them. Once the DTSC has determined that a property is a hazardous waste site or a buffer zone property, an agreement entered into with the property owner to restrict the activities at the property, or, if agreements cannot be reached, a hearing can be held.

Based on these restrictions, the DTSC can require or obtain easements, covenants, servitudes or other restrictions to exclude the following property uses:

- Residences, including mobile homes.
- Hospitals.
- Schools.
- Day care centers.
- Structures for permanent human occupancy other than for industrial purposes.
- Subdivision of the property except those meeting DTSC requirements.

In addition to the above authority, CHSC Sections 25202.5 and 25355.5-8 allow DTSC to acquire or impose easements, restrictions and covenants on owners of hazardous waste facilities to protect the current and future public health and safety.

5. CCC Sections 1457-1471 authorize restrictive covenants for environmental purposes. CCC Section 1471 provides broad authority to impose restrictions on the use of property, if reasonably necessary to protect human health and the environment. The requirements of this type of restrictive environmental covenants are set forth in CCC 1471:

   - The affected property is particularly described.
   - The restrictions will be binding on each successive property owner.
   - The restrictions relate to the use of the land and are reasonably necessary to protect present or future human health and safety.
   - The covenant is properly recorded and indicates the title *"Environmental Restriction."*

   CCC Section 1471 also can be used by EPA, to the extent consistent with CERCLA Section 104(j), and DTSC to impose restrictive covenants, servitudes and easements.

6. The institutional controls could be obtained by the PRPs through commitments agreed to in a Consent Decree at the time of Remedial Action whereby the PRPs commit to acquire restrictive easements, covenants and servitudes in negotiations with landowners. The institutional controls would be enforced on the PRPs through the Consent Decree, and on the land owners through the recordation of the CCC 1457-1471 restrictive covenants. The land use restrictions also could be enforced independently by EPA and the DTSC as third party beneficiaries to the restrictive covenants.

7. The Santa Fe Springs Land Use Plan establishes the allowed as is of land use for areas within the city as per Section 65302(a) of the California Government Code.[5] Under these regulations, Santa Fe Springs has adopted policies on zoning and building requirements for Industrial and Commercial Development. These policies establish guidelines for the current

(5) Industrial and Commercial Development Goals and Santa Fe Springs General Plan Policies 9.1 - 10.2.

zoning (i.e., residential, commercial and industrial) and the requirements for buildings (e.g., methane control in specified areas).[6] The WDI Site is currently zoned as heavy industrial (M-2). A summary of the various zoning regulations is provided in Table 5.11. Residential uses are prohibited in areas zoned M-2. Based on these zoning ordinances, residential development on the Site is prohibited.

8. To further determine the applicability of institutional controls at the Site for screening purposes, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost of institutional controls:

- **Effectiveness**: The institutional controls may be effective in preventing exposure to COCs. The long-term effectiveness of the institutional controls is dependent on their enforcement.
  - Physical restrictions as discussed above are effective in controlling Site risks by limiting access to the Site, and restricting physical contact with waste by signage and access control. However, the physical restrictions must be combined with an enforceable covenant or other restrictions placed on the property and thus be enforceable on future owners.
  - Zoning and land use restrictions can be used to control the land use (e.g., commercial or industrial) by local enforcement. Zoning and land use restrictions are highly effective in reducing Site risks, but may not achieve long-term effectiveness, since they are subject to change by Santa Fe Springs in the future.
  - Restrictive environmental covenants, easements and servitude can be used to control Site activities as shown in Table 5.11. The effectiveness of such restrictions is dependent on their enforcement, using the mechanisms listed below:
    - Injunctions.
    - Specific Performance of Restrictions.
    - Performance Orders.
    - Enforcement by Third Party Beneficiaries or Grantees of the Restrictions.
    - Recovery of Damages.

  Restrictive covenants, easements and servitudes are therefore considered effective, since they can be enforced by legal process, and create an interest in property in favor of the grantees of the restrictions. These restrictions are binding on future owners and tenants, thus providing for long-term effectiveness.

  By controlling Site activities such as excavation, trespassing or construction of residences, the future exposure risks are reduced. Institutional controls will not reduce the TMV of the COCs.

- **Implementability**: The institutional controls would be implementable at the Site. Implementation of the institutional controls will use one or more of mechanisms described above. The implementation of the institutional

[6] Santa Fe Springs Ordinance No. 829.

controls discussed above must be coordinated with the local governments, EPA, DTSC, PRPs and the landowners. The implementability of the three primary types of institutional controls are addressed below:

- Physical restrictions such as signage and access control would be implemented by the PRPs through the Site custodian. The Site custodian would be responsible to control site access and conditions subject to the oversight of the EPA and DTSC. Access to the Site to install and monitor these physical restrictions is necessary, and could depend on reaching agreement with the affected landowners. These controls would allow access to owners. Therefore, the physical restriction institutional controls are implementable.
- Zoning and land use restrictions would be implemented under the current Santa Fe Springs zoning and building regulations. These regulations have been enacted by the Santa Fe Springs City Council. The enforcement of these regulations would be the responsibility of the Building Department of the City of Santa Fe Springs. The Zoning and Land Use restrictions institutional controls are implementable at the Site since they are currently in existence. Additional land use and zoning restrictions could be enacted by the City of Santa Fe Springs, if necessary, to impose further institutional controls at the Site, but their implementability is uncertain, since their enactment is subject to the discretion of the local government.
- Restrictive environmental covenants, easements and servitudes can be implemented at the Site, subject to a grantor who is willing to grant the restriction and a grantee willing to accept it, by EPA under CERCLA 104(j), DTSC under CHSC 25220-25241, 25202.5 and 252355.5-252355.8, the DTSC or the PRPs through acquisition of easements under CCC 1457-1471. These restrictions as discussed above allow restrictions on future use of the Site properties as reflected in Table 5.11 to be imposed on present or future landowners. Therefore these Restrictive Environmental Convenants, Easements and Servitudes are considered implementable, assuming there is agreement by the landowners or appropriate determination of imposition by DTSC.

- **Costs**: Costs for implementing institutional controls are expected to be low to moderate. They would consist of costs for physical restraints, such as signs (which are included in the capital costs for each of the remedial alternatives), and costs for drafting and recording restrictive environmental covenants, easements and servitudes (including updating property title reports). No costs are anticipated for zoning institutional controls as these are already in place as part of the City of Santa Fe Springs Zoning Ordinances. Some portion of the Site custodian costs would be for administration and enforcement of institutional controls, but these costs will be low and encompassed within the overall cost estimates for the remedial alternatives.

  For evaluating the cost of restrictive environmental covenants, servitudes and easements, it is assumed that the land owners will grant these restrictions in return for CERCLA releases granted in a consent decree, or administrative order. Hence, the only costs associated with the restrictions would be legal costs for drafting and recording restrictive environmental covenants, servitudes and easements (including updating property title reports). It is anticipated that these legal costs would be on the order of $5,000 to $10,000 per parcel. Since there are 22 separate parcels at the Site, this represents a cost of $110,000 to $220,000. If any of the landowners refuse to grant the restrictions in return for the CERCLA release, the costs could be higher. However, since the restrictions would not preclude the future use of the Site properties, the costs to purchase restrictions, covenants, easements and/or servitudes, if necessary, is expected to be low to moderate on the order of approximately 10 percent of the properties' market value.

The amount of the Site custodian's time required to administer and enforce the institutional controls will depend on the scope of the remedial alternative selected for the Site, the level of cooperation of the land owners and tenants and the level of redevelopment activity at the Site following completion of remedial activities. The cost for administration and enforcement of institutional controls is anticipated to be low to moderate, and is included within the overall cost estimates for the remedial alternatives.

9. The institutional controls GRA is retained for further evaluation for the following reasons:
   - A range of institutional controls are available to address the current and future risks at the Site, including physical controls, local zoning and land use restrictions and the use of restrictive environmental covenants, easements and servitudes.
   - The institutional controls are enforceable by various legal mechanisms including the following:
     - Local zoning and building code enforcement.
     - EPA and DTSC statutory authority.
     - Enforcement of restrictive environmental covenants, easements and servitudes by:
       - Third Party Beneficiaries or Grantees of Restrictions.
       - Recovery of damages, performance orders or injunctions.
   - The institutional controls are effective in managing Site risks by controlling Site activities. The institutional controls are implementable using existing regulations such as local zoning and land use ordinances and by EPA, DTSC or the PRPS obtaining restrictive environmental covenants, easements and servitudes. Institutional controls are considered cost-effective and are estimated to be in the range of $200,000 to $500,000.

5.1.3 CONTAINMENT

1. The containment GRA for buried waste could be implemented by constructing a cap over areas where the buried waste poses a health risk.

2. The two primary objectives of the capping remedial technology are to reduce infiltration of surface water and to prevent direct contact with the buried waste. In addition, capping will deter soil erosion, and reduce or control air emissions and odors. The reduction of

infiltration minimizes the leaching of contaminants contained in, or associated with buried waste situated above the water table. This results in reducing the potential for migration of contaminants into the ground water and surrounding soil.

3. The RCRA or RCRA-equivalent cap was designed by EPA as a state-of-the-art cap for the closure of hazardous waste facilities. As indicated above, it is designed to prevent exposure to the waste, eliminate infiltration of rainwater and allow collection of soil gas. The RCRA or RCRA-equivalent cap generally uses a synthetic material as a barrier layer. The primary difference between a RCRA versus a RCRA-equivalent cap is the thickness of the layers (e.g., clay layer) which are typically thicker in a RCRA cap.

4. Capping the areas of buried waste provides a barrier that insulates human and ecological receptors from direct contact with the waste. In addition, the cap would prevent soil erosion that might transport contaminated soil away from the Site. Air emissions associated with volatile compounds in the soil and ground water may be decreased by capping. Also capping is sometimes used in conjunction with SVE to enhance recovery of soil vapor.

5. Capping is considered to be a standard construction procedure and is easily implemented. To assure cap integrity, the grading of the cap and area around it would be altered to divert surface run-off from the area. O&M is minimal, with periodic inspection and repair required. Surface water controls will be installed as part of the cap to convey surface water run-off away from areas underlain by wastes. Potential adverse effects during implementation include noise, dust and exhaust emissions during construction. Worker exposure to the contaminants during construction can be minimized by using personal protective equipment (PPE).

6. Although capping is a standard construction practice, the Site may present certain challenges. These may include:
   - Overall Site height considerations due to cap thickness and the proximity of the businesses and the school.
   - The need to complete the cap edge in areas adjacent to or around onsite businesses.
   - The potential combination of various cap types (i.e., monofill, RCRA and asphalt).
   - Negotiating with the various property owners.
   - Degree to which existing fill soil can be incorporated into the cap design.

7. A number of capping options that provide varying degrees of protection have been considered. Each option differs by the number or type of layers comprising the cap. These options reduce

surface water infiltration to varying degrees. Covers can range in thickness from a 4-inch asphalt cap to a 5-foot-thick cap designed in accordance with EPA guidance for closure of hazardous waste landfills in compliance with RCRA.

8. Options for caps include: (1) a RCRA or RCRA-equivalent type layered cap, typically constructed using synthetic liners, clay and gravel. This type of cap also can be designed to support vehicular traffic; (2) Other types of low permeability caps, such as concrete and asphalt, that are designed to prevent or limit surface water infiltration and can support vehicular traffic; (3) Caps are also designed using a monofill layer of compacted soil, which reduces surface water infiltration and prevents exposure of waste. Although the floor slabs of new buildings constructed over areas underlain by wastes can serve a capping function, this cover alternative was not considered in this SFS.

9. The following subsections evaluate each of the caps mentioned above.

5.1.3.1 RCRA or RCRA-Equivalent Cap

1. The typical multimedia RCRA or RCRA-equivalent cap would consist of an engineered system of geosynthetic and earthen materials designed to prevent direct exposure to buried waste and to minimize surface water infiltration. The primary difference between a RCRA versus a RCRA-equivalent cap is the thickness of the layers (e.g., clay layer), which typically is thicker in the RCRA cap. The proposed RCRA-equivalent cap could consist of the following, from top to bottom, or an engineering equivalent:
   - Soil layer.
   - Drainage layer.
   - Geomembrane layer (impermeable barrier to prevent exposure and infiltration).
   - A natural clay or a geosynthetic clay layer (GCL)[7].
   - A gas collection layer is often included in RCRA or RCRA-equivalent caps.
   - Foundation layer or recompacted natural soils.

2. The configuration used would have to be designed to meet Site-specific conditions. For areas of the Site not subject to traffic, these modifications would include drainage to remove excess surface water infiltration that accumulates in the top drainage layer.

(7) A thin layer of bentonite type clay sandwiched between two layers of geofabric.

3. For areas subject to traffic, a wearing surface would have to be provided over the barrier layer. It could consist of gravel or a combination of gravel and asphalt. This wearing surface would have to be thick enough to prevent damage to the geomembrane and clay layers.

4. The minimum thickness of a RCRA or RCRA-equivalent cap may be 2 to 3 feet or more, even if a GCL is used. Due to its complexity, a RCRA or RCRA-equivalent cap would require more intensive maintenance than the wearing surface of the other impermeable caps, particularly in areas subject to traffic.

5. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for a RCRA or RCRA-equivalent cap:
   - **Effectiveness**: A RCRA or RCRA-equivalent cap would be effective for preventing direct exposure to buried waste. It would not reduce the volume or toxicity of COCs. Of the containment alternatives for soils, a RCRA or RCRA-equivalent multimedia cap would result in the lowest amount of surface water infiltration and therefore the smallest potential mobility of COCs to ground water. RCRA or RCRA-equivalent capping provides adequate effectiveness and permanence, while long-term O&M activities are properly carried out. Hazardous waste caps have been shown to be highly effective and easily maintained at numerous sites.
   - **Implementability**: A RCRA or RCRA-equivalent cap is implementable at the Site. However, some concerns exist as to the height of the cap. The full height of a RCRA cap might be aesthetically unappealing, and may cause surface water control problems. A RCRA or RCRA-equivalent cap would also be difficult to implement in some areas of the Site (e.g., adjacent to buildings), due to its thickness and vulnerability to damage. A RCRA or RCRA-equivalent cap would be implementable at locations removed from active buildings or heavy equipment traffic (e.g., reservoir area).
   - **Cost**: A RCRA or RCRA-equivalent cap has a moderate to high cost for the containment alternative. A RCRA or RCRA-equivalent cap is considered cost-effective for capping of the reservoir area. However, RCRA or RCRA-equivalent capping outside the reservoir area becomes cost prohibitive as the total area increases. Furthermore, RCRA capping outside the reservoir is unnecessary for the following reasons:
     - There is a limited volume of waste outside the reservoir.
     - The depth of waste outside the reservoir limits the potential for exposure.
     - Soil gas levels are generally low.
     - Due to the limited volume of waste, the potential for migration is small, and therefore RCRA cap surface water infiltration controls are not required.

6. The RCRA or RCRA-equivalent cap is retained for further evaluation in selected areas, for possible use in locations where it may be implementable, such as the reservoir.

5.1.3.2 Other Caps With Low Permeability (Concrete/Asphalt)

1. Other cap configurations include surfacing with asphalt or concrete. These types of caps can be considered in place of a RCRA cap in situations where they will provide an equivalent barrier to exposure to waste, they will reduce infiltration of surface water, control migration of gas and are relatively easy to maintain. Either the asphalt or concrete cap would be placed over an aggregate base. A typical asphalt cap would be about 8 to 14 inches thick (including aggregate base) while an ideal concrete cap would be about 12 to 14 inches thick (including aggregate base). Both asphalt and concrete can achieve relatively low effective permeabilities. Due to the surface slope that asphalt and concrete pavements are typically constructed with (i.e., usually 1 percent or greater), surface water runs off quickly and has little time to infiltrate. Hence, a properly maintained concrete or asphalt cap can provide better protection against surface water infiltration than a RCRA cap. An asphalt or concrete cap can also be more effective for preventing direct exposure to buried waste due to its durability.

2. A concrete or asphalt cap may be suitable for parking, storage or use as a building foundation. It could also be designed to include a gas barrier or collection layer. An asphalt or concrete cap would consist of the following components (from bottom to top):

   - Foundation layer.
   - Gas collection layer.
   - Subbase layer.
   - Low permeability layer (asphalt or concrete).

   Inclusion of a gas collection layer in an asphalt or concrete cap makes it essentially equivalent to a RCRA cap for control of gas.

3. The use of an asphalt cap is relatively common, although not as frequent as the RCRA or RCRA-equivalent cap types. The use of concrete caps is considerably less common, primarily due to its cost. However, when used as a building foundation, it is considerably more cost-effective. The concrete floor slabs of existing buildings which may be underlain by wastes can be incorporated to serve as part of a cap. Such an application would require building modifications, as described in Section 5.5.3.2, to protect building occupants from

exposure to soil gas. In addition, the floor slabs would require inspection and repair of damage (e.g., cracks) that would otherwise reduce their effectiveness as a cap.

4. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation, and relative cost for asphalt and concrete caps:

   - **Effectiveness**: An asphalt or concrete cap would be effective for preventing direct exposure to buried waste and in reducing the mobility of COCs to ground water. Without proper design and maintenance, these configurations could exacerbate stormwater control problems. Capping with asphalt or concrete would not reduce the volume or toxicity of COCs. Asphalt or concrete capping provides adequate long-term effectiveness and permanence, while long-term O&M activities are properly carried out, i.e., the wearing surface of the asphalt is maintained or replaced regularly. Hazardous waste caps including asphalt and concrete have been shown to be highly effective and easily maintained at numerous sites.
   - **Implementability**: An asphalt or concrete cap is implementable. Periodic maintenance would be required to seal the asphalt cap, or joints and cracks in the concrete cap, for low permeability to be maintained. A concrete cap may be more difficult to implement compared to an asphalt cap in areas where active buildings and operations occur. A concrete cap would also require more effort and cost in the event that buildings are added or removed from the Site as part of future development. Asphalt or concrete capping is implementable in the following areas:
     - Reservoir area.
     - Area 2.
     - Areas adjacent to Area 2.
   - **Cost**: An asphalt cap has the lowest potential cost of the alternatives. A concrete cap is significantly more expensive than an asphalt cap, but more cost-effective than a RCRA or RCRA-equivalent cap. The concrete cap is considered cost-effective as a building foundation alternative. However, it would become cost prohibitive for large areas, and may not be cost-effective from an O&M consideration. The asphalt cap considered in Section 6.1.1.3.2 would be cost-effective for larger areas such as Area 2, and in areas between buildings. Further, the asphalt cap would likely have lower overall O&M costs due to the ease with which it can be repaired (e.g., patching and sealing).

5. The differences between the asphalt and concrete caps are primarily initial capital costs and the frequency and type of maintenance that may be required. A concrete cap would require less maintenance, while an asphalt cap would require periodic resealing. With maintenance, both media may provide approximately equivalent protection against exposure to COCs in buried

waste and approximately equivalent reduction in mobility of COCs. The asphalt cap will be retained for further evaluation, with the caveat that concrete can be used in localized areas should this be deemed necessary during the remedial design process (e.g., building foundations). The low permeability of either of these caps would result in minimal infiltration of water.

6. Asphalt and concrete capping are retained for further evaluation.

5.1.3.3 Monofill (Soil) Cap

1. A monofill cap is an engineered cap placed over the waste areas and compacted to reduce surface water infiltration. These types of caps can be considered in place of a RCRA cap in situations where they will provide an equivalent barrier to exposure to waste, reduce infiltration of surface water, control migration of gas and are relatively easy to maintain. The monofill cap is designed to prevent access to the waste by adjusting the thickness of the cap. Although the permeability of the soil used for construction of a monofill cap may be greater than that of the barrier layer used in a RCRA or RCRA-equivalent cap, surface water infiltration can still be significantly reduced or eliminated, especially in an arid climate such as southern California. The thickness, surface grade, vegetation and drainage system of a monofill cap can be designed such that its performance is equivalent to a RCRA cap. One limitation of the monofill cap is the inability to practically add a gas control or collection system. Therefore, the monofill cap is more feasible in areas with minimal soil gas concerns.

2. A monofill cap could be placed over areas where buried waste exists. The monofill cap would have a variable thickness ranging from 1 to 2 feet to allow flexibility for grading around existing buildings. The 1- to 2-foot thickness is adequate to allow some wear to occur between maintenance episodes while still providing adequate protection against direct exposure to the underlying soils. The wearing surface (the exposed soil layer) could include a marker layer such as geosynthetic netting to help determine when maintenance is required to preserve the minimum thickness of the design specifications.

3. A 5- to 10-foot-thick layer of fill material already exists over portions of the Site which could be left in place. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} cm/sec (TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 to 6 feet of the fill soils is typically free of significant quantities of construction debris. The existing fill material typically satisfies

the performance requirements for a monofill cap (i.e., it has low permeability and will minimize infiltration of surface water; it will promote drainage and [with suitable vegetation] will minimize erosion; it will accommodate settling and subsidence; and it will function with a minimum of maintenance). During design and construction of the monofill cap, the existing fill material will be analyzed at a frequency intended to assure that it complies with the requirements for a monofill cap. Areas found to be out of compliance (e.g., fill material contaminated with construction debris or COCs, highly permeable material, etc.), would be removed and replaced with a minimum thickness of acceptable material. The minimum acceptable thickness of the monofill cap will be determined during design.

4. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation, and relative cost for monofill capping:

    - **Effectiveness**: A monofill cap would be effective for preventing direct exposure to COCs in soils and reducing surface water infiltration. It would significantly reduce the potential mobility of COCs to ground water. A monofill cap would not reduce the volume or toxicity of COCs.

      The monofill cap provides adequate effectiveness and permanence, while long-term O&M activities are properly carried out. Monofill caps have been shown to be highly effective and easily maintained at numerous sites.

    - **Implementability**: A monofill cap would be implementable. It would be easier to construct than other capping alternatives, particularly around process areas and buildings. It would also be suitable for areas routinely subjected to traffic. Monofill capping is implementable in the following areas:
        - Reservoir area.
        - Area 2.
        - Sections adjacent to Area 2.

      Monofill capping is also implementable near onsite buildings or perimeters, due to the reduced height of the cap and its limited impact to onsite buildings and Site operations.

    - **Cost**: A monofill cap has the lowest potential cost of the containment alternatives for buried waste. Monofill capping is considered a low to moderate cost alternative and cost-effective for capping of the reservoir and/or Area 2, and adjacent areas.

5. The use of a monofill cover outside the reservoir may also allow for biodegradation of methane generated wastes there. By allowing the methane to remain in contact with the natural fill materials biodegradation will occur, as observed during the TM No. 9A SVE Treatability Study.

6. As indicated above, the permeability of the RCRA-equivalent and monofill caps are roughly the same, and therefore should have equivalent performance.

7. The monofill cap is retained for further evaluation.

5.1.3.4 Surface Controls

1. Surface controls include Site grading and stormwater controls to reduce rainfall infiltration. As part of TM No. 11 activities at the Site, some stormwater controls have been added. Given that waste at the Site is generally covered by approximately 5 to 10 feet of fill, an adequate monofill çap may already be in place. Therefore, improved stormwater controls such as collection basins and run-off diversions, would improve the existing covers infiltration characteristic. This containment option consists of grading areas to prevent surface water from flowing onto or into areas of buried waste. It can involve stabilizing soils by constructing erosion prevention structures, or diverting and collecting water in lined ditches and canals to prevent surface run-off.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for surface controls:
   - **Effectiveness**: Surface controls alone will not provide adequate long-term effectiveness and permanence for decreasing surface water infiltration.
   - **Implementability**: Surface controls are implementable in the following areas:
     - Reservoir area.
     - Area 2.
     - Sections adjacent to Area 2.
     - Areas adjacent to onsite buildings.
   - **Cost**: Surface controls are a low cost alternative for controlling stormwater and infiltration. However, capping of the reservoir and Area 2 using Alternatives 3 through 5 would provide greater protectiveness, and infiltration control. Therefore, surface controls are not considered cost-effective.

3. Surface controls will not be retained for further evaluation. However, it is anticipated that various surface controls will be included as part of the final Site design.

5.1.4 EXCAVATION OF BURIED WASTES

1. Excavation is not a stand-alone response measure. Therefore, in the final analysis, the effectiveness and implementation issues identified below must be considered in combination with those issues identified for the associated ex-situ treatment or disposal technology used in conjunction with removal. This section discusses the excavation of buried waste at the Site, including the reservoir materials.

5.1.4.1 Excavation of All Buried Wastes

1. Buried waste would be excavated with conventional heavy construction equipment. Excavation of the reservoir may require the use of an excavation dome (e.g., a Sprung® Structure) to control VOCs and odor. The excavation dome is a large enclosure, approximately 150 feet by 300 feet in which the excavation and truck loading occurs. The dome is maintained under negative pressure, and the air emissions are treated and discharged. Shoring of the excavation sidewalls may also be required to prevent collapsing under the dome. There will likely be a need for soil staging areas adjacent to the excavations. Work would be performed in stages as needed for health and safety purposes. The excavated areas would then be backfilled.

2. Direct exposure to buried waste and COCs from air emissions during excavation activities would be a significant health concern for remediation workers and local offsite populations. Emissions would be monitored and controlled using an enclosed tent structure with an air treatment system to protect human health. Remediation workers would be required to utilize PPE to minimize exposure (e.g., level "B" with supplied air).

3. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for soils excavation:
   - **Effectiveness**: Elimination of exposure to COCs is largely governed by the effectiveness of a subsequent treatment or disposal method. Removal would increase the potential exposure risks in the short-term period via air emissions during the Remedial Action. Site workers would be at risk of direct exposure during remediation activities. However, this technology would be permanent and effective in eliminating long-term risks.
   - **Implementability**: As part of the implementation, extensive controls on VOCs, odors and emissions would be needed to prevent exposure to the community. Excavation may not be implementable in isolated areas such as under buildings. Further, offsite disposal or treatment of the waste would be required.

- **Cost**: Excavation costs are typically a small percentage of the overall cost for ex-situ treatment or disposal. However, the cost for this alternative is considered extremely high, as discussed below.

4. Offsite disposal facilities can receive waste that has been treated or untreated. Untreated hazardous waste may require disposal in a permitted Subtitle C Class I landfill or may require treatment onsite or at a permitted treatment, storage and disposal facility (TSDF). Although several Subtitle C landfills are available for disposal of wastes excavated from the Site, their remaining capacity is continually decreasing. The costs associated with disposal in these facilities are high because of disposal fees and transportation costs. Disposal is subject to approval by the accepting facility. Only waste that meets the facilities permitting requirements can be accepted. Risk of traffic accidents during transportation increases the likelihood of inadvertent contaminant releases. Offsite disposal is the least favored action allowed by the Superfund statute; therefore, it is not retained for the following reasons:
   - High landfill disposal costs.
   - Difficulties in controlling VOC and odor emissions.
   - High volumes of traffic (e.g., trucks and heavy equipment) and noise generated by excavation.
   - Increased worker safety concerns due to the need for Level B health and safety protection.
   - Increased risk of traffic accidents.
   - Duration of construction may impact local community for 2 to 3 years.

5. Costs associated with excavation of the reservoir and other Site wastes exceed $150,000,000. These costs are composed of the following elements:

• Excavation Dome and Air Treatment	$2,000,000
• Excavation	$3,200,000
• Transportation and Disposal	$66,200,000
• Backfilling and Restoration	$8,300,000
• Operations, Monitoring and Sampling	$1,100,000
• Risk Cost Contingency	$38,400,000
• Engineering and Permitting	$30,300,000

   The risk cost contingency was assumed to be 50 percent of the remediation costs. This is designed to address potential cost increases in excavation, air collection and treatment, and other related potential cost growth issues.

6. Refer to Appendix A for a more detailed explanation for not retaining excavation and disposal of the buried waste to an offsite TSDF.

5.1.4.2 Excavation of Areas 4 and 7 Wastes

1. The excavation of Areas 4 and 7 wastes is similar to excavating the reservoir wastes. These areas are currently vacant and smaller than the reservoir. The concentrations of COCs in these areas are also less than that found in the reservoir. Therefore, an excavation dome will likely not be required for excavating these areas. Other safety measurements for excavating the reservoir will be taken at Areas 4 and 7.

2. Direct exposure to buried waste and COCs from air emissions during excavation activities would be a significant health concern for remediation workers and local offsite populations. Emissions would be monitored and controlled using water sprays, foams and portable VOC collection blankets with an air treatment system to protect human health. Remediation workers would be required to utilize PPE to minimize exposure (e.g., level "C").

3. To further determine the applicability of this technology, the following criteria assesses the effectiveness in achieving the RAOs, ease of implementation and relative cost for excavation of Areas 4 and 7 wastes:
   - **Effectiveness**: Elimination of exposures to COCs is largely governed by the effectiveness of subsequent treatments or disposal methods. Removal would increase the potential exposure risks in the short-term period via air emissions during the Remedial Action. Site workers would be at risk of direct exposure during excavation and remediation action. However, this technology would be effective in eliminating long-term risks by removing the contaminants to a more secure location, either onsite or offsite.
   - **Implementability**: Areas 4 and 7 are currently vacant. Excavation of these areas is less restricted than areas with businesses.
   - **Cost**: Compared to excavation of reservoir waste, the cost of excavating Areas 4 and 7 would be less. This is due to the fact that these areas are considerably smaller than the reservoir. The relative cost is still much higher than that of other treatment systems.

4. The cost associated with excavation of Areas 4 and 7 will be less than excavation of the reservoir. Excavating these areas may not require an excavation dome, but may still require extensive VOC controls. The area of these Sites is also much smaller than that of the reservoir.

5. Excavation of Areas 4 and 7 will be retained for further evaluation.

5.1.4.3 Excavation of Areas 1, 6 and 8 Wastes

1. The excavation of Areas 1, 6 and 8 wastes is similar to excavating Areas 4 and 7 wastes. The concentrations of COCs at these areas are lower than those found in the reservoir. Therefore, an excavation dome will likely not be required for excavating these areas. Other safety measures for excavating the reservoir will be taken at Areas 1, 6 and 8.

2. Direct exposure to buried waste and COCs from air emissions during excavation activities would be a significant health concern for remediation workers and local offsite populations. Emissions would be monitored and controlled using water sprays, foams or portable VOC collection blankets with an air treatment system to protect human health. Remediation workers would be required to utilize PPE to minimize exposure (e.g., level "C"). Area 8 presents a challenge to excavation, due to the presence of various onsite businesses, and at least three buildings with underlying waste. These buildings may have to be removed and rebuilt, or shored to facilitate excavation of the waste.

3. To further determine the applicability of this technology, the following criteria assesses the effectiveness in achieving the RAOs, ease of implementation and relative cost for excavation of Areas 1, 6 and 8 wastes:
   - **Effectiveness**: Elimination of exposures to COCs is largely governed by the effectiveness of subsequent treatment or disposal methods. Removal would increase the potential exposure risks in the short-term period via air emissions during the Remedial Action. Site workers would be at risk of direct exposure during excavation and remediation activities. However, this technology would be effective in eliminating long-term risks.
   - **Implementability**: Areas 1, 6 and 8 are currently occupied by businesses. Excavation of these areas is restricted. Coordination and cooperation of these businesses will affect the implementability of remediation activities since some businesses may have to be relocated or closed and reconstructed.
   - **Cost**: Compared to excavation of reservoir waste, the cost of excavating Areas 1, 6 and 8 would be less. This is due to the fact that these areas are smaller than the reservoir but currently occupied by businesses which may increase transaction costs, as well as, those due to business closure or building replacement.

4. The cost associated with excavation of Areas 1, 6 and 8 will be higher than Areas 2 through 5. The excavation areas are near and/or underneath structures. Consequently, some buildings may need to be removed. The area businesses will be interrupted by excavation and legal transactions will add to the cost.

5. Excavation of Areas 1, 6 and 8 wastes will be retained for further evaluation.

5.1.4.4 Excavation of Wastes Adjacent to Buildings in Areas 5, 8 and the West Corner of Area 2

1. The excavation of wastes adjacent to buildings in Areas 5, 8 and the west corner of Area 2 is similar to excavating the Areas 1, 6 and 8 wastes. The concentrations of COCs at these areas are lower than those found in the reservoir. Therefore, an excavation dome will likely not be required for excavating these areas. Other safety measures for excavating the reservoir will be taken when excavating wastes adjacent to buildings in Areas 5, 8 and the west corner of Area 2.

2. Direct exposure to buried waste and COCs from air emissions during excavation activities would be a significant health concern for remediation workers and local offsite populations. Emissions would be monitored and controlled using water sprays, foams or portable VOC collection blankets with an air treatment system to protect human health. Remediation workers would be required to utilize PPE to minimize exposure (e.g., level "C"). These locations present a challenge to excavation, due to the proximity of the buildings. These buildings may have to be removed and rebuilt, or shored to facilitate excavation of the waste.

3. To further determine the applicability of this technology, the following criteria assesses the effectiveness in achieving the RAOs, ease of implementation and relative cost for excavation of wastes adjacent to buildings in Areas 5, 8 and the west corner of Area 2:
   - **Effectiveness**: Elimination of exposures to COCs is largely governed by the effectiveness of subsequent treatment or disposal methods. Removal would increase the potential exposure risks in the short-term period via air emissions during the Remedial Action. Site workers would be at risk of direct exposure during excavation and remediation activities. However, this technology would be effective in eliminating long-term risks.
   - **Implementability**: These locations are currently occupied by businesses. Excavation of these areas is very restricted. Coordination and cooperation of these businesses will affect the implementability of remediation activities since some businesses may have to be relocated or closed and reconstructed.
   - **Cost**: Compared to excavation of reservoir waste, the cost of excavating wastes adjacent to buildings in Areas 5, 8 and the west corner of Area 2 would be less. This is due to the fact that these areas are smaller than the reservoir but currently occupied by businesses which may increase transaction costs as well as costs due to business closure or building replacement.

4. The cost associated with excavation of wastes adjacent to buildings in Areas 5, 8 and the west corner of Area 2 will be more than excavation of Areas 4 and 7, but less than excavation of

Areas 1, 6 and 8. The excavation areas are near and/or underneath structures. Consequently, some buildings may need to be removed. The area businesses will be interrupted by excavation and legal transactions will add to the cost.

5. Excavation of wastes adjacent to buildings in Areas 5, 8 and the west corner of Area 2 will be retained for further evaluation.

5.1.5 TREATMENT

5.1.5.1 <u>In-Situ Treatment Processes</u>

1. Treatment technologies include process options designed to remove or reduce the concentrations of COCs in buried waste at the Site. The following in-situ process options have been identified:
   - Physical Treatment:
     - Soil washing.
     - Vitrification.
   - Biological Treatment:
     - Bioventing.
   - Chemical Treatment:
     - Solidification/stabilization.
     - Soil Vapor Extraction.

5.1.5.1.1 Soil Washing

1. In-situ soil washing for soils would use drip irrigation, sprinklers or other surface application equipment to apply wash solution to desorb and/or dissolve COCs from buried waste. Wash solutions would be collected from extraction wells, treated and then recycled or discharged. Surface water contacting the application areas might have to be treated prior to discharge.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for soil washing:
   - **Effectiveness**: This technology has not been demonstrated. Its effectiveness would be uncertain, and it is unlikely that this technology would be capable of uniformly meeting Site cleanup criteria for drilling muds or crude oil. There would be potential for negative impacts on surface and ground water quality.

- **Implementability**: This technology would be difficult to implement. Necessary permitting and approvals may be difficult to obtain. Solution application may be impractical in some areas due to ongoing Site operations. Stormwater handling would also be a concern.
- **Cost**: The cost of this alternative is expected to be high compared to other alternatives and evaluation.

3. This technology is not retained for further consideration for buried waste because it has not been demonstrated and has potential for negative water quality impacts and high cost.

5.1.5.1.2 Vitrification

1. In-situ vitrification is a thermal treatment process that converts contaminated soil into a chemically inert and stable glass and crystalline product by using electrical heat to melt the soil. The process temperatures melt the mineralogical components of the soil, pyrolyze most organic materials and fuse or vaporize metallic components. A hood is placed over the treatment area to capture off-gases. The off-gases are then transported to a gas treatment system.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for vitrification:
   - **Effectiveness**: Highly effective for metals. Vitrification would be effective in reducing the mobility of COCs.
   - **Implementability**: Vitrification is not implementable at the Site. This technology is not feasible for wastes with greater than 5 percent total organic material due to high explosion potential.
   - **Cost**: Vitrification costs are typically high compared to other treatment processes.

3. In-situ vitrification is not retained for future consideration due to the high risk of fire and explosion, and the high costs.

5.1.5.1.3 Bioventing

1. The in-situ bioventing for buried waste would consist of measures to promote natural degradation of organic COCs. This could be accomplished for buried waste by wells and/or trenches. Although it is recognized that bioventing would not be an optimum treatment technology for buried wastes, it is being retained as a gas control technology.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for in-situ bioventing:
   - **Effectiveness**: Not generally effective for crude oil type wastes or waste with low permeability, such as drilling muds. Not effective in treating metals. May be effective in reducing soil gas levels.
   - **Implementability**: In-situ bioventing is implementable for buried waste.
   - **Cost**: This technology would allow natural biodegradation with oxygen and nutrients introduced through atmospheric "breathing" without additional cost other than the costs to install wells and/or trenches.

3. In-situ bioventing for treatment of buried waste was not retained for further consideration for the following reasons:
   - The permeability of the waste is very low, and therefore significant aerobic degradation is unlikely to occur.
   - The waste matrix "drilling muds" are unlikely to support significant bacterial growth for degradation to occur.

5.1.5.1.4 Solidification/Stabilization

1. In-Situ solidification/stabilization treatment technologies result in immobilization of wastes for safe disposal or reuse. Solidification/stabilization treatment processes involve the addition of materials that combine physically (fixation) and/or chemically (stabilization) to decrease the mobility of the original waste constituents. Solidification/stabilization treatment techniques are used for several purposes which may include:
   - Improve handling and physical characteristic of waste.
   - Limit the solubility of compounds in the waste.
   - Detoxification of wastes (e.g., neutralization).
   - Decreased surface area across which the transfer and loss of compounds may occur.

2. The use of solidification/stabilization to treat the reservoir material would produce a solid dewatered material. This material would not need extensive capping, liquids/leachate control or a gas collection system.

3. In-situ solidification/stabilization is generally accomplished using a crane mounted auger system with a 10- to 12-foot-diameter mixing blade. The waste is mixed with pozzolanic materials and allowed to cure in place. Control of VOCs and odors would likely be required during solidification/stabilization.

4. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for in-situ solidification/stabilization:

- **Effectiveness**: The mobility of metals that occur in the buried waste could be reduced through this treatment. Mobility of organic compounds could also be reduced by solidification. There would be some reduction in the volume of COCs because some organic compounds would volatilize during materials handling and mixing of the soil with the stabilizing agents. This technology would not be effective in preventing direct exposure to soils because the COCs concentrations would not be significantly reduced. Therefore, this technology would have to be used in conjunction with a capping alternative.
- **Implementability**: This technology is potentially implementable. In-situ solidification/stabilization could limit the use of other technologies such as bioventing or SVE should these be required in the future. However, the following elements may adversely effect its implementability:
  - The volume of debris in the reservoir may adversely effect production and overall feasibility. Large amounts of debris will interfere with the process and potentially damage the equipment.
  - High temperatures will be observed in the treated wastes due to cementation reactions possibly resulting in VOC emission and odors which could impact the surrounding community. This will require extensive odor and VOC control technologies. This generally will consist of odor scrubbers and carbon adsorptions.
  - The volume and swell generated during this process may be so large as to interfere with later capping activities, and may bring waste materials to the surface, increasing short-term visits and odor and VOC problems.
- **Cost**: Costs would be moderate to high.

5. This technology is not retained for further consideration for buried waste for the following reasons:

- The swell generated by solidification of drilling muds is generally greater than 30 percent which would increase the containment volume significantly.
- Heat generated during curing would create unacceptable emissions.
- Presence of concrete and other debris would make in-situ solidification/stabilization infeasible.

5.1.5.1.5 Soil Vapor Extraction

1. The use of SVE for buried waste would consist of using those technologies to enhance bioremediation of the organic COCs. This would be accomplished for buried waste using

wells or SVE trenches. Although this would not be considered an optimum use of SVE, its use to increase degradation by removing soil gas and introducing oxygen is not uncommon.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for SVE:
   - **Effectiveness**: Not generally effective for crude oil type wastes or waste with low permeability, such as drilling muds. Not effective in treating metals. May be effective in reducing soil gas levels.
   - **Implementability**: SVE is implementable for buried waste, but is not considered practical for the Site conditions.
   - **Cost**: This technology would allow natural biodegradation with oxygen and nutrients introduced using SVE. This technology would be considered in the low range of costs.

3. SVE for treatment of buried waste is not retained for further consideration for the following reasons:
   - The permeability of the waste is low, and therefore significant aerobic degradation is unlikely to occur.
   - The waste matrix "drilling muds" are unlikely to support significant bacterial growth for degradation to occur.

5.1.5.2 Ex-Situ Treatment Processes

1. Treatment technologies include process options designed to remove or reduce the concentrations of COCs in buried waste at the Site. The following ex-situ process options have been identified:
   - Onsite Treatment and Consolidation/Offsite Treatment and Disposal:
     - Biological Treatment:
       - Landfarming/composting.
       - Biotreatment cells.
     - Physical Treatment:
       - Soil washing/solvent extraction.
     - Chemical Treatment:
       - Solidification/stabilization.
     - Thermal Treatment:
       - Thermal desorption.
       - Incineration.

2. If excavated soils are to be treated, a particular waste particle size may be required by the treatment technology. Soil processing will likely be necessary to achieve the required particle

size. Large debris, such as wood and concrete, would have to be separated during excavation or from an excavated waste stockpile using, for example, a vibrating screen. Some debris might have to be crushed in a pulverizer prior to treatment, disposal or backfilling. The vegetation removed during surface clearing activities would be shredded and disposed of onsite. Acceptable particle sizes for treatment typically range from less than 1/4-inch to 3 inches in diameter, depending upon the technology selected.

5.1.5.2.1 Landfarming/Composting

1. Landfarming would involve spreading a layer of buried waste over a lined, impermeable unit that has a leachate collection system. Collected leachate may be recycled back to the treated soil for treatment or be treated separately. Nutrients and water would be added, as required, to optimize conditions for growth of the microbial population that accelerates biodegradation. Landfarming requires substantially more time to complete treatment, compared to the bioreactor technology, as contact between the COCs and bacteria is less. Landfarming would also result in increased short-term exposure to organic COCs via air emissions. The process could be adapted to collect and treat VOCs by covering the soil treatment bed with a plastic film greenhouse and treating the vapors collected inside the greenhouse. Enclosure in a greenhouse may also increase the temperature and hence the rate of bioremediation during cooler seasons.

2. Composting involves mixing buried waste with bulking agents, and the addition of nutrients and moisture to enhance the biodegradation of the organic COCs. The biological processes are maximized at the right temperature, moisture conditions, oxygen content and carbon/nitrogen ratio. Forced aeration, leachate collection and volatilization control can be incorporated into the composting method.

3. There are three principal methods for composting soils: (1) the windrow system consists of mixing the soil with a bulking material and periodically turning the volume; (2) the static pile system consists of mixing the soil with a bulking material, stacking the mixture in a pile, and installing perforated pipe to provide induced aeration of the mix; and (3) the in-vessel system, such as an agitated bed, consists of an aerated bed contained in a horizontal bin. The mixed bulking material and wastes are placed in the bin, and the bin is periodically turned by mechanical means.

4. Composting as a bioremediation process is effective for the treatment of wastewater sludge and solid wastes wherever the organic matter is decomposed into a stable, humus-like substance. Composting systems have also been effective for treating soil contaminated with fuel oil and gasoline.

5. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for landfarming and composting:

   - **Effectiveness**: Landfarming and composting methods could be used to reduce the volume of some organic COCs in soils. Effectiveness in a drilling mud matrix is considered substantially less. These technologies are not effective in treating metals.
   - **Implementability**: Landfarming employs standard construction and agriculture equipment. Relatively large flat areas are required. Site grading, surface preparation and surface water run-on/run-off controls would be necessary. Run-off from the landfarming area would have to be collected and treated. The Site is too small to treat large volumes of soil, so landfarming might have to occur in batches over an extended period of time. Composting using windrows or piles would have similar implementability requirements to landfarming.

     Either of these technologies would require control measures for air emissions. Air emissions could potentially be a problem due to the high VOC levels in the buried waste. Landfarming or composting emissions may be the most difficult to control because of the necessarily large source area and the proximity of the community.
   - **Cost**: Landfarming is generally less costly than other ex-situ bioremediation technologies such as composting. Composting cost is generally higher than landfarming because of the treatment time required.

6. Bioremediation by landfarming and composting is not retained because it is not well demonstrated for soils with the COCs in a drilling mud type matrix that occur onsite and because of the potential for high air emissions near the general public. Furthermore, the area necessary to successfully bioremediate the volume of soils at the Site is not available.

5.1.5.2.2 Biotreatment Cells

1. Enhanced bioremediation involves accelerating the biodegradation process by providing controlled treatment conditions such as: (1) uniform or optimum distribution of water, oxygen and nutrients; (2) pH control; (3) possibly the addition of cultured bacteria or other soil amendments; and (4) possibly temperature control.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for biotreatment cells:

   - **Effectiveness**: Potentially effective in reducing the level of petroleum hydrocarbons in soils. Effectiveness in drilling mud matrix is considered substantially less. Not effective in treating metals.
   - **Implementability**: May not be implementable due to the limited area at the Site. Air emissions could potentially be a problem due to the high VOC levels in the buried waste. Emissions may be difficult to control because of the necessarily large source area and the proximity of the surrounding community.
   - **Cost**: Biotreatment cell costs are relatively high compared to other treatment options.

3. Remediation by biotreatment cells is not retained because it is not well demonstrated for soils with the types of wastes and drilling muds that occur onsite, and because of the potential for air emissions to the immediate general public. Furthermore, the area necessary to successfully bioremediate the volume of soils at the Site is not available.

5.1.5.2.3 Soil Washing/Solvent Extraction

1. Excavated buried waste could be washed to remove COCs. Soil washing/solvent extraction processes transfer the COCs from the solid phase to a liquid phase, and requires additional liquid phase treatment processes, such as a bioreactor or chemical oxidation.

2. The buried waste is screened to a suitable particle size for the feedstream, and mixed with a washing solution. As discussed below, there are two types of process options. Some commercially available treatment systems use combinations of these processes.

3. One process option is a volume-reduction process. Aqueous solutions are used to wash fine particulates out of the soil, separating the fines (e.g., silts) from coarser soil particles (e.g., sand and gravel). This treatment process produces three streams; a sludge containing the fine particles, wastewater and "washed" soil containing the coarser fragments. Because most organic compounds tend to adsorb to the finer particles, the volume of COCs impacted material is reduced. The sludge containing the COCs impacted fine particles must be treated further or disposed in a landfill. After contact with the soil, the washing solution is treated to remove the COCs and then either recycled for additional soil washing or discharged. In some

cases, multiple washings of the soils are required to reduce COCs concentrations to acceptable levels. Treated soils may contain trace concentrations of the washing solution; however, the process is designed to render soils suitable for reuse as backfill in the excavation area or elsewhere onsite.

4. In the second process option, a surfactant solution, or organic solvent, is used to desorb or dissolve COCs from the soils. Various washing solutions or solvents are commercially available. Solvent processes rely on the solubility of the COCs in the solvent and good contact between the solvent and the solids. Small particle sizes facilitate solution contact with the soils matrix.

5. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for ex-situ soil washing/solvent extraction:

   - **Effectiveness**: Soil washing or solvent extraction could be effective for reducing the volume and concentration of COCs in soils. However, the technology has not been shown to be effective in drilling muds or crude oil. Soil washing will not likely meet ROD cleanup goals.
   - **Implementability**: Implementation of this alternative would require significant materials and waste by-product handling. Fill materials and debris may be difficult to process. Bench-scale or pilot studies would be required to develop process parameters.
   - **Cost**: The cost of soil washing/solvent extraction is typically high. Bioremediation provides similar effectiveness with generally lower unit costs.

6. Soil washing/solvent extraction will not be retained for further evaluation as a key part of remediation at the Site because: (1) the consistency of the buried waste; and (2) difficulty of implementation. Other technologies provide similar effectiveness with generally lower unit costs.

5.1.5.2.4 Solidification/Stabilization

1. Solidification/stabilization of COCs in buried waste can be accomplished by the use of additives or binding agents. Solidification uses processes that mechanically bind compounds within a matrix together, but do not necessarily interact chemically with the solidification reagents. Stabilization involves the addition of reagents that chemically react with COCs in the soil to limit solubility or mobility.

2. Solidification/stabilization is generally accomplished by mixing soils with the appropriate additives using standard construction equipment. If the soil is not relatively homogeneous, screening and/or shredding is required prior to mixing to reduce the particle size and assure effective binding and immobilization within the matrix.

3. Solidification/stabilization can be used to treat some types of characteristically hazardous waste so that it can then be transported and disposed offsite as nonhazardous solid waste, or it can be deposited in the excavation area as backfill.

4. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for ex-situ solidification/stabilization:
   - **Effectiveness**: The mobility of metals that occur in some soils could be reduced through this treatment. Mobility of organic compounds might also be reduced by solidification. There would be some reduction in the volume of COCs because some organic compounds would volatilize during materials handling and mixing of the soil with the stabilizing agents. This technology would not be effective in preventing direct exposure to buried waste because the COCs concentrations would not be significantly reduced.
   - **Implementability**: Solidification/stabilization of excavated soil is implementable. However, the excavation of the material in the reservoir would have the same limitations as discussed in Section 5.1.4 due to odors and VOC emissions. Ex-situ treatment equipment is commercially available.
   - **Cost**: Solidification/stabilization costs are extremely high due to the excavation and health and safety costs.

5. Due to its high costs and limited effectiveness in preventing direct contact with COCs in the buried waste, solidification for soils will not be retained.

5.1.5.2.5 Thermal Desorption

1. Thermal desorption processes are designed to remove the VOCs and SVOCs from a soils matrix based on the volatility of the target compounds and operating temperatures of the treatment unit. Thermal desorption is different from incineration in that the soils are heated to a high enough temperature to volatilize the COCs but not destroy them; the COCs are collected and destroyed or treated. The excavated soils would be screened to remove oversize materials (typically greater than 1 inch) and then heated to a temperature sufficient to volatilize the COCs.

Temperature and residence time are important process parameters. In addition, soil characteristic (e.g., high moisture content), require significantly higher temperatures to maintain the effectiveness of this process.

2. Heating methods vary but include: direct contact with heated gases; hot sand or heated screw conveyor; infrared radiation; and direct contact with the heated walls of a kiln. Several vendors have developed, or are in the process of developing, units that can achieve higher temperatures and are more cost-effective.

3. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for thermal desorption:

   - **Effectiveness**: Thermal desorption could be effective for removal of some portion of the COCs from the buried waste. However, the petroleum hydrocarbon portion of the buried waste is crude oil, which is generally resistant to thermal desorption, due to its high boiling point. The condensate and/or vapors collected would require further treatment or disposal. Thermal desorption is not effective for removal of metals. In addition, due to the high moisture content of the soils at the Site, very high temperatures would be required. This would increase the level of energy required to remove the contaminants, resulting in a decrease in the effectiveness of thermal desorption.
   - **Implementability**: Extensive materials handling would be required to obtain an amenable feed stream. Pilot-scale tests would be required to demonstrate the feasibility of thermal desorption.
   - **Cost**: The relative cost of thermal desorption is high, especially considering pilot testing and air monitoring that could be required. Further, condensate handling would also increase the treatment costs. Costs are expected to be very high. The costs are also high due to the costs previously discussed with regards to controlling odors and VOC emissions. Permitting for thermal desorption may be difficult, due to the potential for emissions to air.

4. Thermal desorption will not be retained for further evaluation in conjunction with other treatment or disposal technologies, due to the high costs and the limited effectiveness on crude oil.

5.1.5.2.6 Incineration (Onsite or Offsite)

1. Incineration oxidizes and degrades organic compounds in soils at high temperatures (1,300 to 2,200 degrees Fahrenheit [°F]) under controlled conditions. Organic compounds

degrade to carbon dioxide, water vapor, sulfur dioxide and nitrogen oxide gas. Pollution control equipment is designed to limit air emissions, particularly for the products of incomplete combustion.

2. The rotary kiln type of incinerator is the most widely used design. Other incinerator types, such as conventional or circulating fluidized beds, or infrared, are proven effective for removal of organic compounds, but are less implementable than the rotary kiln due to process type or equipment availability.

3. The rotary kiln system consists of a chamber, a secondary combustion chamber, a scrubber and additional support equipment. The rotary kiln is a cylindrical, refractory-lined shell mounted on an axis at a slight incline. It is capable of handling a wide variety of solids and liquids. The rotary kiln is a well-demonstrated and frequently used incineration method.

4. Incineration may also be used for treatment of process residuals from other treatment technologies. For example, condensate from thermal desorption might be sent offsite for incineration. A test burn would be required to identify the operating controls required to achieve the desired efficiency for the selected incineration process. Metals present may volatilize and oxidize within the unit, or remain in the treated soils, depending on the operating temperatures.

5. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for incineration:

   - **Effectiveness**: Incineration would be effective in oxidizing and degrading organic COCs. The metals and debris in the soil may constrain the effectiveness of this process. The residual ash may require solidification or disposal as a hazardous waste, considering that metals in the feed material will become concentrated in the ash. The TMV would be significantly reduced through treatment.
   - **Implementability**: Air emission controls, ash characteristic and particulate size/waste feed requirements are critical considerations to the feasibility of incinerating soils. A significant amount of materials handling would be required. A test burn would be necessary to determine the feasibility of treatment and emission controls for onsite incineration. Meeting the substantive requirements of permits and gaining community acceptance for onsite incineration may be difficult.

- **Cost**: Onsite incineration costs are very high due to the cost of incinerator mobilization, trial burns and compliance with permit requirements, as well as the problems and costs associated with excavation of the buried waste. Offsite incineration costs are also high for many of the same reasons plus transportation costs.

6. Onsite and offsite incineration will not be retained for further evaluation for buried waste and for use on residuals from other treatment technologies for the following reasons:
   - Onsite incineration is not likely to be permitted by the AQMD or DTSC in a mixed industrial/residential area.
   - Offsite incineration capacity is not available in California and therefore the waste must be transported to Utah or Texas for incineration.
   - The residuals from incineration are often hazardous and may require further treatment.
   - Excavation of the reservoir wastes is not feasible or economic, as discussed in Section 5.1.4.1.

5.1.5.2.7 Offsite Treatment and Disposal

1. As previously discussed in Section 5.1.5.2, a number of transfer options and technologies could be considered for offsite treatment. However, due to the excavation and offsite transportation concerns discussed in Section 5.1.4, this GRA will not be retained for further consideration.

5.2 SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOIL GAS

1. GRAs are based on the physical conditions of the Site, the COCs present and other background information presented in Chapter 2.0 and Table 5.2. The GRAs considered for the Site soil gas include:
   - Institutional controls.
   - Containment.
   - Treatment.

2. **Institutional Controls**: Institutional controls protect human health by preventing exposure to soil gas through implementation of restrictions on use of property by its owners via: (1) The recordation of restrictive environmental easements; (2) Implementation of local governmental land use or zoning restrictions; and (3) Restricting physical access to property by controls such as signage. The restrictions in 1 and 2 above can be applied to individual

Site parcels to restrict activities by the property owners, such as prohibiting subsurface disturbance or other interference with selected remedial alternatives, prohibiting residential developments, and restricting future use of ground water.

3. **Containment**: Containment measures prevent potential exposure to COCs in soil gas. Containment measures for soil gas generally refer to physical barriers that collect, seal or otherwise isolate localized areas.

4. **Treatment**: Soil gas could be treated either by active or passive treatment. Treatment methods could include bioventing and SVE.

5. An evaluation and screening of each of these GRAs in terms of the effectiveness, implementability and cost criteria is provided below and summarized in Table 5.7.

6. Based on the evaluation of the soil gas conditions at the Site, the following alternative were selected for evaluation:
   - Administrative:
     - No Further Action.
     - Institutional Controls.
   - Containment:
     - Vertical Soil Gas Barriers.
     - Vertical Collection Wells.
     - Horizontal Soil Gas Barriers.
   - Treatment:
     - Soil Vapor Extraction.
     - Bioventing.

5.2.1 NO FURTHER ACTION

1. Although not considered a remedial technology under the NCP, No Further Action implies that further Remedial Actions would not be taken. The No Further Action Alternative has been included for comparison purposes.

2. To further evaluate the No Further Action alternative, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost:
   - **Effectiveness**: The No Further Action GRA would not be effective in preventing future direct exposure to COCs in soil gas. It would not reduce the TMV of COCs. It would not be effective in mitigating the risk of indirect exposure to COCs. Current and future risks would not be decreased.

- **Implementability**: The No Further Action GRA is implementable.
- **Cost**: The No Further Action GRA would have a substantial low cost, but would not be considered cost-effective, since reduction in risk would not be achieved.

3. The No Further Action GRA is retained to provide a basis for comparison of other alternatives.

5.2.2 INSTITUTIONAL CONTROLS

1. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:
   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.
   - Local governmental zoning and land use controls. Examples of these types of controls could include:
     - Zoning restricts land use to commercial/industrial land use.
     - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
     - Requiring the landowner to obtain approval for building or Site modifications from EPA, the Department of Toxic Substances Control (DTSC), and Site custodian.
   - Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
     - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate

worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.
  - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.
- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:
   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - California Health and Safety Code (CHSC) Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - California Civil Code (CCC) Sections 1457-1471, with specific reference to restrictive environmental covenants.

   The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

3. A more detailed discussion of institutional controls is provided in Section 5.1.2.

4. To further determine the applicability of institutional controls at the Site for screening purposes, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost of institutional controls:
   - **Effectiveness**: The institutional controls may be effective in preventing exposure to COCs. The long-term effectiveness of the institutional controls is dependent on their enforcement.
     - Physical restrictions as discussed above are effective in controlling Site risks by limiting access to the Site, and restricting physical contact with waste by signage and access control. However, the physical restrictions must be combined with an enforceable covenant or other restrictions placed on the property and thus be enforceable on future owners.

- Zoning and land use restrictions can be used to control the land use (e.g., commercial or industrial) by local enforcement. Zoning and land use restrictions are highly effective in reducing Site risks, but may not achieve long-term effectiveness, since they are subject to change by Santa Fe Springs in the future.
- Restrictive environmental covenants, easements and servitude can be used to control Site activities as shown in Table 5.11. The effectiveness of such restrictions is dependent on their enforcement, using the mechanisms listed below:
  - Injunctions.
  - Specific Performance of Restrictions.
  - Performance Orders.
  - Enforcement by Third Party Beneficiaries or Grantees of the Restrictions.
  - Recovery of Damages.

Restrictive covenants, easements and servitudes are therefore considered effective, since they can be enforced by legal process, and create an interest in property in favor of the grantees of the restrictions. These restrictions are binding on future owners and tenants, thus providing for long-term effectiveness.

By controlling Site activities such as excavation, trespassing or construction of residences, the future exposure risks are reduced. Institutional controls will not reduce the TMV of the COCs.

- **Implementability**: The institutional controls would be implementable at the Site. Implementation of the institutional controls will use one or more of mechanisms described above. The implementation of the institutional controls discussed above must be coordinated with the local governments, EPA, DTSC, PRPs and the landowners. The implementability of the three primary types of institutional controls are addressed below:
  - Physical restrictions such as signage and access control would be implemented by the PRPs through the Site custodian. The Site custodian would be responsible to control site access and conditions subject to the oversight of the EPA and DTSC. Access to the Site to install and monitor these physical restrictions is necessary, and could depend on reaching agreement with the affected landowners. These controls would allow access to owners. Therefore, the physical restriction institutional controls are implementable.
  - Zoning and land use restrictions would be implemented under the current Santa Fe Springs zoning and building regulations. These regulations have been enacted by the Santa Fe Springs City Council. The enforcement of these regulations would be the responsibility of the Building Department of the City of Santa Fe Springs. The Zoning and Land Use restrictions institutional controls are implementable at the Site since they are currently in existence. Additional land use and zoning restrictions could be enacted by the City of Santa Fe Springs, if necessary, to impose further institutional controls at the Site, but their implementability is uncertain, since their enactment is subject to the discretion of the local government.
  - Restrictive environmental covenants, easements and servitudes can be implemented at the Site, subject to a grantor who is willing to grant the restriction and a grantee willing to accept it, by EPA under

CERCLA 104(j), DTSC under CHSC 25220-25241, 25202.5 and 252355.5-252355.8, the DTSC or the PRPs through acquisition of easements under CCC 1457-1471. These restrictions as discussed above allow restrictions on future use of the Site properties as reflected in Table 5.7 to be imposed on present or future landowners. Therefore these Restrictive Environmental Convenants, Easements and Servitudes are considered implementable, assuming there is agreement by the landowners or appropriate determination of imposition by DTSC.

- **Costs**: Costs for implementing institutional controls are expected to be low to moderate. They would consist of costs for physical restraints, such as signs (which are included in the capital costs for each of the remedial alternatives), and costs for drafting and recording restrictive environmental covenants, easements and servitudes (including updating property title reports). No costs are anticipated for zoning institutional controls as these are already in place as part of the City of Santa Fe Springs Zoning Ordinances. Some portion of the Site custodian costs would be for administration and enforcement of institutional controls, but these costs will be low and encompassed within the overall cost estimates for the remedial alternatives.

  For evaluating the cost of restrictive environmental covenants, servitudes and easements, it is assumed that the land owners will grant these restrictions in return for CERCLA releases granted in a consent decree, or administrative order. Hence, the only costs associated with the restrictions would be legal costs for drafting and recording restrictive environmental covenants, servitudes and easements (including updating property title reports). It is anticipated that these legal costs would be on the order of $5,000 to $10,000 per parcel. Since there are 22 separate parcels at the Site, this represents a cost of $110,000 to $220,000. If any of the landowners refuse to grant the restrictions in return for the CERCLA release, the costs could be higher. However, since the restrictions would not preclude the future use of the Site properties, the costs to purchase restrictions, covenants, easements and/or servitudes, if necessary, is expected to be low to moderate on the order of approximately 10 percent of the properties' market value.

  The amount of the Site custodian's time required to administer and enforce the institutional controls will depend on the scope of the remedial alternative selected for the Site, the level of cooperation of the land owners and tenants and the level of redevelopment activity at the Site following completion of remedial activities. The cost for administration and enforcement of institutional controls is anticipated to be low to moderate, and is included within the overall cost estimates for the remedial alternatives.

5. The institutional controls GRA is retained for further evaluation for the following reasons:

   - A range of institutional controls are available to address the current and future risks at the Site, including physical controls, local zoning and land use restrictions and the use of restrictive environmental covenants, easements and servitudes.

   - The institutional controls are enforceable by various legal mechanisms including the following:
     - Local zoning and building code enforcement.

- EPA and DTSC statutory authority.
- Enforcement of restrictive environmental covenants, easements and servitudes by:
    - Third Party Beneficiaries or Grantees of Restrictions.
    - Recovery of damages, performance orders or injunctions.

- The institutional controls are effective in managing Site risks by controlling Site activities. The institutional controls are implementable using existing regulations such as local zoning and land use ordinances and by EPA, DTSC or the PRPS obtaining restrictive environmental covenants, easements and servitudes. Institutional controls are considered cost-effective and are estimated to be in the range of $200,000 to $500,000.

6. The institutional controls GRA for soil gas is retained for further evaluation because of the following reasons:
    - Provides a mechanism to control current and future activities at the Site.
    - Prevents exposure to waste materials by controlling Site access.

5.2.3 CONTAINMENT

5.2.3.1 Active/Passive Containment

1. The containment alternatives consist of the use of barriers or collection points to prevent the migration of soil gas. The collection alternatives are generally passive, although they may be operated initially under active conditions. These alternatives include:
    - Vertical soil gas barriers (e.g., trenches, slurry walls).
    - Vertical collection wells.
    - Horizontal soil gas barriers (e.g., caps with gas collection layers).

2. Both active and passive technologies have been included here, since physically they are very similar, with the exception of the use of a blower in active systems. Furthermore, it is likely that if an active system was used at this Site, it may eventually become a passive type system when soil gas levels are within the requirements.

5.2.3.1.1 Vertical Soil Gas Barriers

1. Vertical soil gas barriers, such as slurry walls, flexible membrane liners (FMLs), and trenches have been used to prevent migration of soil gas. Slurry walls have been routinely used at landfills and other sites to form a gas barrier. Under most circumstance, the side of a slurry wall exposed to soil gas is vented or contains a collection system to prevent build-up of soil gases, although this is not always necessary.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost of soil gas containment:

   - **Effectiveness**: The long-term effectiveness and permanence of a soil gas barrier is unknown given Site conditions (e.g., waste materials, soil gas composition). However, soil gas barriers have generally shown adequate long-term performance in similar usage conditions.
   - **Implementability**: Vertical soil gas barriers are considered generally implementable at the Site. However, this implementability may be affected by unknown subsurface materials such as debris, underground utilities and access restrictions by property owners.
   - **Cost**: The installation of a vertical soil gas barrier is considered a high cost alternative.

3. This alternative has a high cost. Numerous factors have a significant impact on the final cost of the installation of a slurry wall vertical soil gas barrier:

   - Type, activity and distribution of contaminants.
   - Depth, length and width of the wall.
   - Geological and hydrological characteristic.
   - Distance from material sources and their costs.
   - Requirements for wall protection and maintenance.
   - Type of slurry and backfill used.
   - Other Site-specific requirements as identified in the Site assessment (e.g., presence of contamination, debris or buried utilities).
   - Planning, permitting, regulatory interaction and Site restoration.

4. Based on current Site conditions, the potential length of the wall and its high unit cost; vertical soil gas barriers were eliminated from further consideration.

5.2.3.1.2 Vertical Collection Wells

1. Vertical collection wells can be used to control the migration of subsurface gases. By collecting the soil gas in a well, it can be actively or passively vented and treated before discharge. Depending on the soil types and the local lithology, wells may be equally effective as vertical soil gas barriers constructed in trenches in preventing gas migration. Most well systems are designed similar to SVE systems to remove VOCs from soil. The vapor wells are connected to the suction side of a vacuum extraction unit through a surface collection manifold. The vacuum draws vapors from the unsaturated zone, and also decreases the pressure in soil voids, thereby causing vaporization of additional VOCs. This technology is discussed under SVE in Section 5.2.4.1.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for soil gas containment:

   - **Effectiveness**: The long-term effectiveness and permanence of a vertical collection well is known, given the results of TM No. 9A. The vapor well system at the Site has generally shown adequate long-term performance in similar usage conditions.
   - **Implementability**: Vertical collection wells are considered generally implementable at the Site. However, this implementability may be affected by unknown subsurface materials such as debris, underground utilities and access restrictions by property owners.
   - **Cost**: The installation of a vertical collection well is considered a low cost alternative.

3. Based on current Site conditions, the vertical collection wells for soil gas were retained for further consideration.

5.2.3.1.3 Horizontal Soil Gas Barriers

1. Horizontal soil gas barriers are commonly used in conjunction with capping. A collection layer is installed at the base of a cap to collect gas and allow for its removal and treatment. The collection layer generally consists of perforated pipes, with a geotextile or grid overlay. The pipes are then connected to various collection points which are then brought out through the cap to an active or passive vent.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost of soil gas containment:

   - **Effectiveness**: The use of horizontal soil gas barriers would achieve the required long-term effectiveness and permanence by removing soil gas constituents for treatment and discharge.
   - **Implementability**: Horizontal soil gas barriers are implementable with a variety of cap types including:
     - RCRA-equivalent cap.
     - Asphalt/concrete cap.
     - Evapotranspiration cap.

     Gas collection layers have been routinely installed in caps and present minimal constructibility issues.
   - **Cost**: Installation of horizontal soil gas barriers is relatively low in cost and is highly cost-effective.

3. Horizontal soil gas barriers are retained for further evaluation as part of the overall capping alternative.

5.2.4 TREATMENT

1. As described in Section 5.2.3, various containment alternatives were considered for controlling soil gas. As part of this Remedial Action, the focus is to achieve some level of treatment by actively extracting soil gas, or using a passive treatment method. Soil gas treatment technologies are highly developed and sufficient data exists to allow selection of the most cost-effective technology to be decided during the design phase. The following Remedial Actions will be considered:
   - Soil vapor extraction (e.g., active treatment).
   - Bioventing (e.g., passive treatment).

2. Treatment response actions are designed to reduce the TMV of contaminants in soil gas and to meet feasibility study objectives. The treatment technology retained for further study is SVE (active/passive) and bioventing.

5.2.4.1 Soil Vapor Extraction (SVE)

1. SVE is an in-situ unsaturated zone soil remediation technology in which a vacuum is applied to the soil to induce a flow of air and remove VOCs and SVOCs from the soil. Offgas from the system may be treated to recover or destroy the contaminants depending on local and state air emission regulations. Vertical extraction wells are used at depths of 5 feet or greater and have been successfully applied as deep as 30 feet at the Site (TRC, 1999a). Horizontal extraction vents (trenches or horizontal borings) can also be used to accommodate unusual contaminant zone geometry, limited drill rig access or other site-specific factors.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for SVE.
   - **Effectiveness**: Use of SVE to treat exceedances of the soil gas standards would not likely provide long-term effectiveness or permanence in areas where buried waste is located, since the source of soil gas would likely remain untreated. In areas outside the buried waste, SVE may provide long-term effectiveness and permanence.

- **Implementability**: SVE is implementable at the Site based on the TM No. 9A SVE Treatability Study data. Some areas where debris or underground utilities are located may present implementation problems.
- **Cost**: For comparison purposes, the costs for SVE are relatively low.

3. SVE is therefore retained as a feasible alternative for the control of soil gas in areas which exceed soil gas standards at the Site perimeter, or areas adjacent to buildings. In conjunction with building modifications, SVE would be used to remediate specific areas if exceedances occur.

5.2.4.2 Bioventing

1. Bioventing is an in-situ process, which increases the oxygen content in the subsurface soils to enhance biodegradation of hydrocarbons. Bioventing can be accomplished using an active process, similar to SVE, or in a passive mode using atmospheric pressure to increase the oxygen levels in soils.

2. Bioventing target contaminants are VOCs and some fuels. Moisture and organic contents and air permeability of the soil will affect their performance.

3. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for bioventing:
    - **Effectiveness**: Bioventing would achieve long-term effectiveness and permanence by reducing the soil gas levels, decreasing methane generation and by degrading some portion of the subsurface petroleum hydrocarbons. However, data is not available to predict the level of degradation that would occur or the length of time it may require. Bioventing may have long-term effectiveness and permanence in isolated areas where elevated soil gas levels have been observed.
    - **Implementability**: Bioventing is implementable at the Site based on the TM No. 9A SVE Treatability Study data. Active implementation may be affected by the specific area conditions, proximity to active businesses and subsurface conduits or debris.
    - **Cost**: For comparison purposes, the costs for bioventing are relatively low.

4. Bioventing technologies will be retained for further evaluation.

5.3 SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR GROUND WATER

1. GRAs are based on physical conditions of the Site, COCs present and other background information presented in Chapter 2.0 and Table 5.3. The GRAs considered for the Site ground water are no further action, institutional controls, monitoring, and extraction and treatment.

2. **Institutional Controls**: Institutional controls protect human health by preventing exposure to contaminated ground water through implementation of restrictions on use of property by the owners via: (1) The recordation of restrictive environmental covenants, easements and servitudes; (2) Implementation of local governmental land use or zoning restrictions; and (3) Restricting physical access to property by controls such as signage. The restrictions in 1 and 2 above can be applied to individual Site parcels to restrict activities by the property owners, such as prohibiting subsurface disturbance or other interference with selected remedial alternatives, prohibiting residential developments, and restricting future use of ground water.

3. **Ground Water Monitoring**: The current ground water monitoring program at the Site would be continued.

4. **Extraction and Treatment**: Ground water can be extracted and treated at the Site. This process involves the use of extraction wells and an onsite treatment system.

5. An evaluation of this GRA in terms of effectiveness, implementability and cost criteria is provided below and summarized in Table 5.8.

5.3.1 NO FURTHER ACTION

1. As discussed above, No Further Action is not considered a remedial technology. No Further Action implies that further Remedial Actions would not be taken. The No Further Action alternative has been included for comparison purposes.
2. To further determine the applicability of the No Further Action alternative, the following criteria are used to assess the effectiveness in achieving RAOs, ease of implementation and relative cost:
   - **Effectiveness**: The No Further Action GRA would be effective in preventing future direct exposure to COCs in ground water since current ground water controls (e.g., Regional Board requirements) prohibit

unauthorized usage. Furthermore, contribution to the regional ground water problems have not been attributed to the Site. The No Further Action GRA would not reduce the TMV of COCs. It would not be effective in mitigating the risk of indirect exposure to COCs.

- **Implementability**: The No Further Action GRA is implementable.
- **Cost**: The No Further Action GRA would have a substantial low cost, but is not considered cost-effective.

3. The No Further Action GRA is retained to provide a basis for comparison of other alternatives.

5.3.2 INSTITUTIONAL CONTROLS

1. State Water Codes give the RWQCB the authority to impose institutional controls. Institutional control details are not listed in the Water Codes. The RWQCB reserves the right to interpret the Water Codes to implement institutional controls that would protect the general public from contaminated ground water.

2. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:

   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.
   - Local governmental zoning and land use controls. Examples of these types of controls could include:
     - Zoning restricts land use to commercial/industrial land use.
     - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
     - Requiring the landowner to obtain approval for building or Site modifications from EPA, the Department of Toxic Substances Control (DTSC), and Site custodian.
   - Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal

instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:

- New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.
- Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.

- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

3. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:

   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - California Health and Safety Code (CHSC) Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - California Civil Code (CCC) Sections 1457-1471, with specific reference to restrictive environmental covenants.

   The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

4. A more detailed discussion of institutional controls is provided in Section 5.1.2.

5. To further determine the applicability of institutional controls at the Site for screening purposes, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost of institutional controls:

- **Effectiveness**: The institutional controls may be effective in preventing exposure to COCs. The long-term effectiveness of the institutional controls is dependent on their enforcement.
    - Physical restrictions as discussed above are effective in controlling Site risks by limiting access to the Site, and restricting physical contact with waste by signage and access control. However, the physical restrictions must be combined with an enforceable covenant or other restrictions placed on the property and thus be enforceable on future owners.
    - Zoning and land use restrictions can be used to control the land use (e.g., commercial or industrial) by local enforcement. Zoning and land use restrictions are highly effective in reducing Site risks, but may not achieve long-term effectiveness, since they are subject to change by Santa Fe Springs in the future.
    - Restrictive environmental covenants, easements and servitude can be used to control Site activities as shown in Table 5.7. The effectiveness of such restrictions is dependent on their enforcement, using the mechanisms listed below:
        - Injunctions.
        - Specific Performance of Restrictions.
        - Performance Orders.
        - Enforcement by Third Party Beneficiaries or Grantees of the Restrictions.
        - Recovery of Damages.

  Restrictive covenants, easements and servitudes are therefore considered effective, since they can be enforced by legal process, and create an interest in property in favor of the grantees of the restrictions. These restrictions are binding on future owners and tenants, thus providing for long-term effectiveness.

  By controlling Site activities such as excavation, trespassing or construction of residences, the future exposure risks are reduced. Institutional controls will not reduce the TMV of the COCs.

- **Implementability**: The institutional controls would be implementable at the Site. Implementation of the institutional controls will use one or more of mechanisms described above. The implementation of the institutional controls discussed above must be coordinated with the local governments, EPA, DTSC, PRPs and the landowners. The implementability of the three primary types of institutional controls are addressed below:
    - Physical restrictions such as signage and access control would be implemented by the PRPs through the Site custodian. The Site custodian would be responsible to control site access and conditions subject to the oversight of the EPA and DTSC. Access to the Site to install and monitor these physical restrictions is necessary, and could depend on reaching agreement with the affected landowners. These controls would allow access to owners. Therefore, the physical restriction institutional controls are implementable.

- Zoning and land use restrictions would be implemented under the current Santa Fe Springs zoning and building regulations. These regulations have been enacted by the Santa Fe Springs City Council. The enforcement of these regulations would be the responsibility of the Building Department of the City of Santa Fe Springs. The Zoning and Land Use restrictions institutional controls are implementable at the Site since they are currently in existence. Additional land use and zoning restrictions could be enacted by the City of Santa Fe Springs, if necessary, to impose further institutional controls at the Site, but their implementability is uncertain, since their enactment is subject to the discretion of the local government.
- Restrictive environmental covenants, easements and servitudes can be implemented at the Site, subject to a grantor who is willing to grant the restriction and a grantee willing to accept it, by EPA under CERCLA 104(j), DTSC under CHSC 25220-25241, 25202.5 and 252355.5-252355.8, the DTSC or the PRPs through acquisition of easements under CCC 1457-1471. These restrictions as discussed above allow restrictions on future use of the Site properties as reflected in Table 5.11 to be imposed on present or future landowners. Therefore these restrictive environmental convenants, easements and servitudes are considered implementable, assuming there is agreement by the landowners or appropriate determination of imposition by DTSC.

- **Costs**: Costs for implementing institutional controls are expected to be low to moderate. They would consist of costs for physical restraints, such as signs (which are included in the capital costs for each of the remedial alternatives), and costs for drafting and recording restrictive environmental covenants, easements and servitudes (including updating property title reports). No costs are anticipated for zoning institutional controls as these are already in place as part of the City of Santa Fe Springs Zoning Ordinances. Some portion of the Site custodian costs would be for administration and enforcement of institutional controls, but these costs will be low and encompassed within the overall cost estimates for the remedial alternatives.

  For evaluating the cost of restrictive environmental covenants, servitudes and easements, it is assumed that the land owners will grant these restrictions in return for CERCLA releases granted in a consent decree, or administrative order. Hence, the only costs associated with the restrictions would be legal costs for drafting and recording restrictive environmental covenants, servitudes and easements (including updating property title reports). It is anticipated that these legal costs would be on the order of $5,000 to $10,000 per parcel. Since there are 22 separate parcels at the Site, this represents a cost of $110,000 to $220,000. If any of the landowners refuse to grant the restrictions in return for the CERCLA release, the costs could be higher. However, since the restrictions would not preclude the future use of the Site properties, the costs to purchase restrictions, covenants, easements and/or servitudes, if necessary, is expected to be low to moderate on the order of approximately 10 percent of the properties' market value.

  The amount of the Site custodian's time required to administer and enforce the institutional controls will depend on the scope of the remedial alternative selected for the Site, the level of cooperation of the land owners and tenants and the level of redevelopment activity at the Site following completion of remedial activities. The cost for administration and enforcement of institutional controls is anticipated to be low to moderate, and is included within the overall cost estimates for the remedial alternatives.

6. The institutional controls GRA is retained for further evaluation for the following reasons:
   - A range of institutional controls are available to address the current and future risks at the Site, including physical controls, local zoning and land use restrictions and the use of restrictive environmental covenants, easements and servitudes.
   - The institutional controls are enforceable by various legal mechanisms including the following:
     - Local zoning and building code enforcement.
     - EPA and DTSC statutory authority.
     - Enforcement of restrictive environmental covenants, easements and servitudes by:
       - Third Party Beneficiaries or Grantees of Restrictions.
       - Recovery of damages, performance orders or injunctions.
   - The institutional controls are effective in managing Site risks by controlling Site activities. The institutional controls are implementable using existing regulations such as local zoning and land use ordinances and by EPA, DTSC or the PRPS obtaining restrictive environmental covenants, easements and servitudes. Institutional controls are considered cost-effective and are estimated to be in the range of $200,000 to $500,000.

7. A more detailed discussion of institutional controls is provided in Section 5.1.2.

8. The institutional controls GRA is retained for further evaluation for the following reasons:
   - Provides a mechanism to control current and future activities at the Site.
   - Prevents exposure to waste materials by controlling Site access.

5.3.3 MONITORING

1. The monitoring of ground water conditions would consist of eight wells located on and adjacent to the Site. The wells will be monitored on a regular basis to determine if Site conditions change or if leakage has occurred from the reservoir.

2. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for treatment:
   - **Effectiveness**: Monitoring would not be effective in preventing the migration of COCs in ground water. However, the monitoring would allow an early warning that leakage had occurred from the reservoir so that treatment could be implemented.

- **Implementability**: Monitoring of ground water is implementable at the Site.
- **Cost**: The cost for monitoring is considered low in comparison to other alternatives.

5.3.4 TREATMENT

1. Treatment of ground water would consist of a series of extraction wells located within the western portion of the Site. Extraction wells would be placed within the interior of the Site to create an inward gradient and capture the contaminated ground water. The treated water would be disposed to injection wells located along the western and southern perimeter of the Site to improve the inward hydraulic gradient.

2. The extraction wells would pump ground water at a rate of 10 gpm. At this rate, the predicted time to extract ground water at the Site would be approximately 13.5 years. These extraction wells would prevent the migration of ground water to adjacent businesses. Consequently, this treatment system would restrict the migration of COCs to Area 2 and eliminate the long-term exposure to COCs.

3. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for treatment:
   - **Effectiveness**: This treatment method is very effective in preventing the migration of COCs in ground water. This treatment method is not effective in controlling soil gas vapors. Future infiltration of rainwater will affect total volume of ground water at the Site.
   - **Implementability**: The implementability of this treatment method will vary depending on the cooperation of adjacent businesses. Most businesses in Areas 1 and 8 will be affected by installation of the extraction and injection wells.
   - **Cost**: The cost of this treatment method is considered high, but will need to incorporate other methods to control soil gas vapors.

4. The ground water treatment alternative is retained for further evaluation for the following reasons:
   - Provides a mechanism to regulate future ground water conditions by controlling the migrating COCs.
   - Complies with regulatory requirements by eliminating COCs at the Site.

5.4 SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR LIQUIDS LOCATED WITHIN AND OUTSIDE THE RESERVOIR BOUNDARY

1. GRAs are based on physical conditions of the Site, COCs present and other background information presented in Chapter 2.0 and Table 5.4. GRAs considered for the Site liquids include:
   - Institutional Controls.
   - Collection.
   - Containment.

2. **Institutional Controls**: Institutional controls protect human health by preventing exposure to liquids through implementation of restrictions on use of property by its owners via: (1) The recordation of restrictive environmental covenants, easements and servitudes; (2) Implementation of local governmental land use or zoning restrictions; and (3) Restricting physical access to property by controls such as signage. The restrictions in 1 and 2 above can be applied to individual Site parcels to restrict activities by the property owners, such as prohibiting subsurface disturbance or other interference with selected remedial alternatives, prohibiting residential developments, and restricting future use of ground water.

3. **Collection**: Site liquids could be collected for disposal. Collection methods would include an active collection system using multiple leachate collection points (e.g., reservoir recovery wells) located within the reservoir boundary. A passive collection system could also be considered using phytoremediation as a alternative technology.

4. **Containment**: Containment measures prevent potential exposure to COCs in the Site liquids. Containment measures usually refer to physical barriers that cover, seal or otherwise isolate localized areas.

5. An evaluation of each of these GRAs in terms of the effectiveness, implementability and cost criteria is provided below and summarized in Table 5.9.

6. Based on the evaluation of the liquids conditions at the Site, the following alternatives were selected for detailed analysis:
   - Administrative:
     - No Future Action.
     - Institutional controls.
   - Collection:
     - Recovery Wells (reservoir leachate collection points [LCPs]).

- Containment:
  - RCRA or RCRA-Equivalent Cap.
  - Concrete or Asphalt Cap.
  - Monofill Cap.

5.4.1 NO FURTHER ACTION

1. As indicated previously, the No Further Action alternative implies that further Remedial Actions would not be taken. The No Further Action alternative has been included in this section for comparison purposes.
2. To further determine applicability of the No Further Action alternative, the following criteria are used to assess effectiveness in achieving RAOs, ease of implementation and relative cost for No Further Action:
   - **Effectiveness**: The No Further Action GRA would not be effective in reducing the TMV of COCs. It would not be effective in mitigating the risk of indirect exposure to COCs.
   - **Implementability**: The No Further Action response is implementable.
   - **Cost**: The No Further Action GRA would have a substantially low cost.
3. The No Further Action GRA is retained to provide a basis for comparison of other alternatives.

5.4.2 INSTITUTIONAL CONTROLS

1. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:
   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.
   - Local governmental zoning and land use controls. Examples of these types of controls could include:
     - Zoning restricts land use to commercial/industrial land use.

- Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
- Requiring the landowner to obtain approval for building or Site modifications from EPA, the Department of Toxic Substances Control (DTSC), and Site custodian.

- Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
  - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.
  - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.
- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:

- The United States' authority to acquire interests in property under CERCLA Section 104(j).
- California Health and Safety Code (CHSC) Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
- California Civil Code (CCC) Sections 1457-1471, with specific reference to restrictive environmental covenants.

The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

3. To further determine the applicability of institutional controls at the Site for screening purposes, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost of institutional controls:

- **Effectiveness**: The institutional controls may be effective in preventing exposure to COCs. The long-term effectiveness of the institutional controls is dependent on their enforcement.
  - Physical restrictions as discussed above are effective in controlling Site risks by limiting access to the Site, and restricting physical contact with waste by signage and access control. However, the physical restrictions must be combined with an enforceable covenant or other restrictions placed on the property and thus be enforceable on future owners.
  - Zoning and land use restrictions can be used to control the land use (e.g., commercial or industrial) by local enforcement. Zoning and land use restrictions are highly effective in reducing Site risks, but may not achieve long-term effectiveness, since they are subject to change by Santa Fe Springs in the future.
  - Restrictive environmental covenants, easements and servitude can be used to control Site activities as shown in Table 5.11. The effectiveness of such restrictions is dependent on their enforcement, using the mechanisms listed below:
    - Injunctions.
    - Specific Performance of Restrictions.
    - Performance Orders.
    - Enforcement by Third Party Beneficiaries or Grantees of the Restrictions.
    - Recovery of Damages.

  Restrictive covenants, easements and servitudes are therefore considered effective, since they can be enforced by legal process, and create an interest in property in favor of the grantees of the restrictions. These restrictions are binding on future owners and tenants, thus providing for long-term effectiveness.

  By controlling Site activities such as excavation, trespassing or construction of residences, the future exposure risks are reduced. Institutional controls will not reduce the TMV of the COCs.

- **Implementability**: The institutional controls would be implementable at the Site. Implementation of the institutional controls will use one or more of mechanisms described above. The implementation of the institutional controls discussed above must be coordinated with the local governments, EPA, DTSC, PRPs and the landowners. The implementability of the three primary types of institutional controls are addressed below:
  - Physical restrictions such as signage and access control would be implemented by the PRPs through the Site custodian. The Site custodian would be responsible to control site access and conditions

subject to the oversight of the EPA and DTSC. Access to the Site to install and monitor these physical restrictions is necessary, and could depend on reaching agreement with the affected landowners. These controls would allow access to owners. Therefore, the physical restriction institutional controls are implementable.

- Zoning and land use restrictions would be implemented under the current Santa Fe Springs zoning and building regulations. These regulations have been enacted by the Santa Fe Springs City Council. The enforcement of these regulations would be the responsibility of the Building Department of the City of Santa Fe Springs. The Zoning and Land Use restrictions institutional controls are implementable at the Site since they are currently in existence. Additional land use and zoning restrictions could be enacted by the City of Santa Fe Springs, if necessary, to impose further institutional controls at the Site, but their implementability is uncertain, since their enactment is subject to the discretion of the local government.
- Restrictive environmental covenants, easements and servitudes can be implemented at the Site, subject to a grantor who is willing to grant the restriction and a grantee willing to accept it, by EPA under CERCLA 104(j), DTSC under CHSC 25220-25241, 25202.5 and 252355.5-252355.8, the DTSC or the PRPs through acquisition of easements under CCC 1457-1471. These restrictions as discussed above allow restrictions on future use of the Site properties as reflected in Table 5.7 to be imposed on present or future landowners. Therefore these Restrictive Environmental Convenants, Easements and Servitudes are considered implementable, assuming there is agreement by the landowners or appropriate determination of imposition by DTSC.

- **Costs**: Costs for implementing institutional controls are expected to be low to moderate. They would consist of costs for physical restraints, such as signs (which are included in the capital costs for each of the remedial alternatives), and costs for drafting and recording restrictive environmental covenants, easements and servitudes (including updating property title reports). No costs are anticipated for zoning institutional controls as these are already in place as part of the City of Santa Fe Springs Zoning Ordinances. Some portion of the Site custodian costs would be for administration and enforcement of institutional controls, but these costs will be low and encompassed within the overall cost estimates for the remedial alternatives.

  For evaluating the cost of restrictive environmental covenants, servitudes and easements, it is assumed that the land owners will grant these restrictions in return for CERCLA releases granted in a consent decree, or administrative order. Hence, the only costs associated with the restrictions would be legal costs for drafting and recording restrictive environmental covenants, servitudes and easements (including updating property title reports). It is anticipated that these legal costs would be on the order of $5,000 to $10,000 per parcel. Since there are 22 separate parcels at the Site, this represents a cost of $110,000 to $220,000. If any of the landowners refuse to grant the restrictions in return for the CERCLA release, the costs could be higher. However, since the restrictions would not preclude the future use of the Site properties, the costs to purchase restrictions, covenants, easements and/or servitudes, if necessary, is expected to be low to moderate on the order of approximately 10 percent of the properties' market value.

The amount of the Site custodian's time required to administer and enforce the institutional controls will depend on the scope of the remedial alternative selected for the Site, the level of cooperation of the land owners and tenants and the level of redevelopment activity at the Site following completion of remedial activities. The cost for administration and enforcement of institutional controls is anticipated to be low to moderate, and is included within the overall cost estimates for the remedial alternatives.

4. The institutional controls GRA is retained for further evaluation for the following reasons:
   - A range of institutional controls are available to address the current and future risks at the Site, including physical controls, local zoning and land use restrictions and the use of restrictive environmental covenants, easements and servitudes.
   - The institutional controls are enforceable by various legal mechanisms including the following:
     - Local zoning and building code enforcement.
     - EPA and DTSC statutory authority.
     - Enforcement of restrictive environmental covenants, easements and servitudes by:
       - Third Party Beneficiaries or Grantees of Restrictions.
       - Recovery of damages, performance orders or injunctions.
   - The institutional controls are effective in managing Site risks by controlling Site activities. The institutional controls are implementable using existing regulations such as local zoning and land use ordinances and by EPA, DTSC or the PRPS obtaining restrictive environmental covenants, easements and servitudes. Institutional controls are considered cost-effective and are estimated to be in the range of $200,000 to $500,000.

5. The institutional controls GRA is retained for further evaluation for the following reasons:
   - Provides a mechanism to control current and future activities at the Site.
   - Prevents exposure to waste materials by controlling Site access.

5.4.3 COLLECTION

5.4.3.1 Active Collection System

1. Site liquids collection could include multiple LCPs (e.g., reservoir recovery wells). Recovery wells are the most frequently used method of liquids collection. Wells are screened throughout the depth where collection is desired, and submersible pumps or bailers are used to extract the water. Liquids monitoring would be required to monitor the effectiveness of the collection process.

2. In addition to liquids collection by wells, various other technologies could also be used, including the following:
   - Trenching:
     - The reservoir interior test trench excavations (TRC, 1998c) demonstrated that trenching may not be practical due to the instability of the drilling muds.
   - Perforated horizontal collection wells.
   - Dual extraction SVE.

3. This technology includes the use of existing reservoir wells and possible installation of a treatment option to treat organic in liquids. Various treatment processes could be used to manage the extracted liquids. For purposes of this SFS, liquids treatment will focus on the process demonstrated as part of TM No. 13. TM No. 13 demonstrated that the liquids could be treated using an oil/water separator. The recovered oil would be collected for recycling or disposal. The aqueous phase collected could be treated using carbon adsorption and discharged to an industrial sewer.

5.4.3.1.1 Recovery Wells

1. Treatment alternatives are those processes that allow for collection and monitoring of Site liquids (e.g., reservoir liquids/leachate).

2. To further determine applicability of this technology, the following criteria are used to assess effectiveness in achieving RAOs, ease of implementation, and relative cost for institutional controls:
   - **Effectiveness**: The recovery wells alternative provides long-term protection by removing reservoir liquids/leachate as shown in the TM No. 13 Treatability Study. However, monitoring is required to determine the permanence of this alternative.
   - **Implementability**: The recovery wells alternative is an easily implementable, proven technology as shown in the TM No. 13 Treatability Study.
   - **Cost**: The recovery wells alternative is a cost-effective option when large volumes of liquids are being pumped from the reservoir. Unit costs increase as pumping rates decrease.

5.4.3.1.2 Trenching and Horizontal Collection Wells

1. To further determine applicability of this technology, the following criteria are used to assess effectiveness in achieving RAOs, ease of implementation, and relative cost for trenching and horizontal collection wells:
   - **Effectiveness**: Trenching and horizontal collection wells are not very effective in heterogeneous conditions such as those that exist at the Site. TM No. 13 and TM No. 12 show limited liquids recovery for these collection methods.
   - **Implementability**: Trenches and horizontal collection wells will be difficult to implement. The reservoir interior test trench excavations (TRC, 1998c) demonstrated that trenching might not be practical due to the instability of the drilling muds.
   - **Cost**: The cost of trenching and horizontal collection wells is generally more than that of recovery wells.

2. Trenching and horizontal collection wells are not retained for further evaluation due to their limited liquids recovery capacity and instability of the drilling muds.

5.4.3.2 Passive Collection System

1. Phytoremediation as a means of a passive system could be used for liquids collection. The use of plants and trees to remove subsurface liquids has been demonstrated at other sites.

2. To further determine applicability of this technology, the following criteria are used to assess effectiveness in achieving RAOs, ease of implementation and relative cost for phytoremediation:
   - **Effectiveness**: Trees and plants can be effective in controlling subsurface liquids.
   - **Implementability**: Phytoremediation technology is easily implementable. However, implementation would require a significant amount of time for tree and plant growth and liquids removal.
   - **Cost**: The costs for this alternative are low to moderate.

3. This technology provides a reduction in the volume of liquids, but due to the time requirements for phytoremediation to be effective this technology will not be retained.

5.4.4 CONTAINMENT

1. Site liquids containment would be similar to the containment technologies listed for buried waste. Alternative technologies include: RCRA or RCRA-equivalent cap, asphalt, concrete, and monofill caps. Each of these technologies are discussed below and are evaluated for their effectiveness for containing or controlling liquids located within and outside the reservoir boundary.

5.4.4.1 RCRA/RCRA-Equivalent Capping

1. Containment is the process used to control movement of soil and particulates, reduce infiltration of surface water and prevent direct contact with Site liquids. In addition, capping deters soil erosion and can control air emissions and odors. A reduction in infiltration of surface water minimizes the potential for leaching of contaminants to ground water and reduces the potential for subsurface liquids migration.

2. Capping of hazardous waste Sites has become a common practice and is EPAs presumptive remedy for landfills (conducting RI/FS for CERCLA Municipal Landfill Sites, EPA 540/P-91-001, 1991). Several Superfund sites have selected containment as an alternative for the remedial design. The following sections summarize the containment alternatives retained for this SFS.

3. A RCRA or RCRA-equivalent multilayer cap may consist of the following components (from the bottom up):
   - Foundation layer.
   - Gas collection layer.
   - Barrier layer, e.g., FML, clay.
   - Drainage layer.
   - Vegetative layer.

4. The RCRA or RCRA-equivalent cap was designed by the EPA as a state-of-the-art cap for the closure of hazardous waste facilities. As indicated above, it is designed to prevent exposure to the waste, eliminate infiltration of surface water and allow collection of soil gas. The RCRA or RCRA-equivalent cap generally uses a synthetic material in the barrier layer. The primary difference between a RCRA cap versus a RCRA-equivalent cap is the thickness of the layers (e.g., clay layer) which is typically much thicker in the RCRA cap.

5. To further determine applicability of these technologies, the following criteria are used to assess effectiveness in achieving RAOs, ease of implementability and relative cost for liquids containment:

- **Effectiveness**: RCRA and RCRA-equivalent capping provides adequate long-term effectiveness and permanence, provided postclosure operations and maintenance activities are properly carried out. Hazardous waste caps have been shown to be highly effective and easily maintained at numerous Sites. RCRA and RCRA-equivalent capping would briefly increase the short-term risks at the Site during construction activities. However, since minimal amounts of waste material would be disturbed, this does not present a significant risk
- **Implementability**: A RCRA or RCRA-equivalent cap is implementable at the Site. However, some concerns exist as to the height of the cap. The full height of a RCRA cap might be aesthetically unappealing, and may cause surface water control problems. A RCRA or RCRA-equivalent cap would also be difficult to implement in some areas of the Site (e.g., adjacent to buildings), due to its thickness and vulnerability to damage. A RCRA or RCRA-equivalent cap would be implementable at locations removed from active buildings or heavy equipment traffic (e.g., reservoir area).
- **Cost**: The cost for RCRA and RCRA-equivalent capping is considered high for the reservoir area, in comparison to other alternatives.

5.4.4.2 <u>Concrete or Asphalt Cap</u>

1. A concrete or asphalt cap could also be used for capping the Site. This engineered cap may be suitable for parking vehicles, storage or a building foundation. It could also be designed to include a gas barrier or collection layer. An asphalt or concrete cap would consist of the following components:

- Foundation layer.
- Gas collection layer.
- Subbase layer.
- Low permeability layer (asphalt or concrete).

2. The use of an asphalt cap is relatively common, although not as frequently used as the RCRA or RCRA-equivalent type. The use of concrete caps is considerably less common, primarily due to its cost. However, when used as a building foundation as well as a cap, it is considerably more cost-effective.

3. To further evaluate the applicability of these technologies the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementability and relative cost for liquids containment:

- **Effectiveness**: Asphalt or concrete capping provides adequate effectiveness and permanence by preventing further infiltration of surface water and exposure to subsurface liquids, while long-term O&M activities are properly carried out.
- **Implementability**: Asphalt or concrete capping is implementable in an area of the Site. A concrete cap may be more difficult to implement compared to an asphalt cap in areas where active buildings and operations occur. A concrete cap would also require more effort and cost in the event that buildings are added or removed from the Site as part of future development. Asphalt or concrete capping is implementable in the following areas:
  - Reservoir area.
  - Area 2.
  - Sections adjacent to Area 2.
- **Cost**: The asphalt cap would be cost-effective compared to a concrete cap. The concrete cap is considered more cost-effective when it is also used as a building foundation. However, it would become cost prohibitive for large areas, and may not be cost-effective from an O&M consideration. The asphalt cap would be more cost-effective for larger areas such as Area 2, and in areas between buildings. Further, the asphalt cap would likely have lower overall O&M costs due to the ease with which it can be repaired (e.g., patching and sealing).

5.4.4.3 Monofill Cap

1. A monofill cap is an engineered soil cap placed over the waste areas and compacted to reduce infiltration. The monofill cap is designed to prevent access to the waste by adjusting the thickness of the cap. Surface water infiltration can be significantly reduced or eliminated, especially in an arid climate such as southern California, Arizona and Nevada. One limitation of the monofill cap is the inability to practically add gas control or collection systems. Therefore, the monofill cap is more feasible in areas with minimal soil gas concerns.

2. To further evaluate the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementability and relative cost for liquids containment:

- **Effectiveness**: Monofill capping provides adequate effectiveness and permanence, while long-term O&M activities are properly carried out.
- **Implementability**: Monofill capping is implementable in the following areas:
  - Reservoir area.
  - Area 2.
  - Sections adjacent to Area 2.

Monofill capping is not implementable near onsite buildings or perimeters, due to the height of the cap and its impact to onsite buildings and Site operations.

- **Cost**: Monofill capping is considered to be a low to moderate cost alternative and is considered cost-effective for capping of the reservoir area and Area 2.

3. Monofill capping is retained for further evaluation for subsurface liquids.

5.5 SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR INDOOR AIR

1. GRAs are based on the physical conditions of the Site, the COCs present and other background information presented in Chapter 2.0 and Table 5.5. The GRAs considered for the indoor air include:
   - Institutional controls.
   - Containment.
   - Treatment.

2. **Institutional Controls**: Institutional controls protect human health by preventing exposure to COCs in indoor air through implementation of restrictions on use of property by property owners via: (1) The recordation of restrictive environmental covenants, easements and servitudes; (2) Implementation of local governmental land use or zoning restrictions; and (3) Restricting physical access to property by controls such as signage. The restrictions in 1 and 2 above can be applied to individual Site parcels to restrict activities by the property owners, such as prohibiting subsurface disturbance or other interference with selected remedial alternatives, prohibiting future residential developments, and restricting future use of ground water.

3. **Containment**: Containment measures prevent potential exposure to COCs in indoor air. Containment measures for COCs in indoor air generally refer to physical barriers that collect, seal or otherwise isolate localized areas.

4. **Treatment**: Indoor air could be treated by active or passive measures. Treatment methods could include bioventing or SVE of the subsurface soils to prevent infiltration of gases into buildings. Treatment may also include the use of building venting to reduce or prevent the potential buildup of gases with a building.

5. An evaluation and screening of each of these GRAs in terms of the effectiveness, implementability and cost criteria are provided below and summarized in Table 5.5.

5.5.1 NO FURTHER ACTION

1. No Further Action implies that no further Remedial Actions would be taken. Although not considered a remedial technology under the NCP, the No Further Action Alternative has been included for comparison purposes only.

2. To further evaluate the applicability of the No Further Action alternative, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost:
   - **Effectiveness**: The No Further Action GRA would not be effective in preventing future direct exposure to COCs in indoor air. It would not reduce the volume, toxicity or mobility of COCs. It would not be effective in mitigating the risk of indirect exposure to COCs.
   - **Implementability**: The No Further Action response is implementable.
   - **Cost**: The No Further Action GRA would have a substantially low cost.

3. The No Further Action GRA is retained to provide a basis for comparison of other alternatives.

5.5.2 INSTITUTIONAL CONTROLS

1. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:
   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.

- Local governmental zoning and land use controls. Examples of these types of controls could include:
  - Zoning restricts land use to commercial/industrial land use.
  - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
  - Requiring the landowner to obtain approval for building or Site modifications from EPA, the Department of Toxic Substances Control (DTSC), and Site custodian.
- Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
  - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.
  - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.
- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:
   - The United States' authority to acquire interests in property under CERCLA Section 104(j).

- California Health and Safety Code (CHSC) Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
- California Civil Code (CCC) Sections 1457-1471, with specific reference to restrictive environmental covenants.

The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

3. To further determine the applicability of institutional controls at the Site for screening purposes, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost of institutional controls:
   - **Effectiveness**: The institutional controls may be effective in preventing exposure to COCs. The long-term effectiveness of the institutional controls is dependent on their enforcement.
     - Physical restrictions as discussed above are effective in controlling Site risks by limiting access to the Site, and restricting physical contact with waste by signage and access control. However, the physical restrictions must be combined with an enforceable covenant or other restrictions placed on the property and thus be enforceable on future owners.
     - Zoning and land use restrictions can be used to control the land use (e.g., commercial or industrial) by local enforcement. Zoning and land use restrictions are highly effective in reducing Site risks, but may not achieve long-term effectiveness, since they are subject to change by Santa Fe Springs in the future.
     - Restrictive Environmental Covenants, Easements and servitude can be used to control Site activities as shown in Table 5.7. The effectiveness of such restrictions is dependent on their enforcement, using the mechanisms listed below:
       - Injunctions.
       - Specific Performance of Restrictions.
       - Performance Orders.
       - Enforcement by Third Party Beneficiaries or Grantees of the Restrictions.
       - Recovery of Damages.

     Restrictive covenants, easements and servitudes are therefore considered effective, since they can be enforced by legal process, and create an interest in property in favor of the grantees of the restrictions. These restrictions are binding on future owners and tenants, thus providing for long-term effectiveness.

     By controlling Site activities such as excavation, trespassing or construction of residences, the future exposure risks are reduced. Institutional controls will not reduce the TMV of the COCs.

- **Implementability**: The institutional controls would be implementable at the Site. Implementation of the institutional controls will use one or more of mechanisms described above. The implementation of the institutional controls discussed above must be coordinated with the local governments, EPA, DTSC, PRPs and the landowners. The implementability of the three primary types of institutional controls are addressed below:
  - Physical restrictions such as signage and access control would be implemented by the PRPs through the Site custodian. The Site custodian would be responsible to control site access and conditions subject to the oversight of the EPA and DTSC. Access to the Site to install and monitor these physical restrictions is necessary, and could depend on reaching agreement with the affected landowners. These controls would allow access to owners. Therefore, the physical restriction institutional controls are implementable.
  - Zoning and land use restrictions would be implemented under the current Santa Fe Springs zoning and building regulations. These regulations have been enacted by the Santa Fe Springs City Council. The enforcement of these regulations would be the responsibility of the Building Department of the City of Santa Fe Springs. The Zoning and Land Use restrictions institutional controls are implementable at the Site since they are currently in existence. Additional land use and zoning restrictions could be enacted by the City of Santa Fe Springs, if necessary, to impose further institutional controls at the Site, but their implementability is uncertain, since their enactment is subject to the discretion of the local government.
  - Restrictive environmental covenants, easements and servitudes can be implemented at the Site, subject to a grantor who is willing to grant the restriction and a grantee willing to accept it, by EPA under CERCLA 104(j), DTSC under CHSC 25220-25241, 25202.5 and 252355.5-252355.8, the DTSC or the PRPs through acquisition of easements under CCC 1457-1471. These restrictions as discussed above allow restrictions on future use of the Site properties as reflected in Table 5.7 to be imposed on present or future landowners. Therefore these Restrictive Environmental Convenants, Easements and Servitudes are considered implementable, assuming there is agreement by the landowners or appropriate determination of imposition by DTSC.
- **Costs**: Costs for implementing institutional controls are expected to be low to moderate. They would consist of costs for physical restraints, such as signs (which are included in the capital costs for each of the remedial alternatives), and costs for drafting and recording restrictive environmental covenants, easements and servitudes (including updating property title reports). No costs are anticipated for zoning institutional controls as these are already in place as part of the City of Santa Fe Springs Zoning Ordinances. Some portion of the Site custodian costs would be for administration and enforcement of institutional controls, but these costs will be low and encompassed within the overall cost estimates for the remedial alternatives.

  For evaluating the cost of restrictive environmental covenants, servitudes and easements, it is assumed that the land owners will grant these restrictions in return for CERCLA releases granted in a consent decree, or administrative order. Hence, the only costs associated with the restrictions would be legal costs for drafting and recording restrictive environmental covenants, servitudes and easements (including updating property title reports). It is anticipated that these legal costs would be on the order of $5,000 to $10,000 per parcel. Since there are 22 separate parcels at the Site, this represents a cost of $110,000 to $220,000. If any of the landowners refuse to grant the restrictions in return for the CERCLA release, the costs could be higher. However, since the restrictions would not preclude the future use of the Site properties, the costs to purchase restrictions, covenants, easements and/or servitudes, if necessary, is expected to be low to moderate on the order of approximately 10 percent of the properties' market value.

The amount of the Site custodian's time required to administer and enforce the institutional controls will depend on the scope of the remedial alternative selected for the Site, the level of cooperation of the land owners and tenants and the level of redevelopment activity at the Site following completion of remedial activities. The cost for administration and enforcement of institutional controls is anticipated to be low to moderate, and is included within the overall cost estimates for the remedial alternatives.

4. The institutional controls GRA is retained for further evaluation for the following reasons:
   - A range of institutional controls are available to address the current and future risks at the Site, including physical controls, local zoning and land use restrictions and the use of restrictive environmental covenants, easements and servitudes.
   - The institutional controls are enforceable by various legal mechanisms including the following:
     - Local zoning and building code enforcement.
     - EPA and DTSC statutory authority.
     - Enforcement of restrictive environmental covenants, easements and servitudes by:
       - Third Party Beneficiaries or Grantees of Restrictions.
       - Recovery of damages, performance orders or injunctions.
   - The institutional controls are effective in managing Site risks by controlling Site activities. The institutional controls are implementable using existing regulations such as local zoning and land use ordinances and by EPA, DTSC or the PRPS obtaining restrictive environmental covenants, easements and servitudes. Institutional controls are considered cost-effective and are estimated to be in the range of $200,000 to $500,000.

5. The institutional controls GRA is retained for further evaluation for the following reasons:
   - Provides a mechanism to control the current and future activities at the Site.
   - Prevents exposure to waste materials by controlling Site access.

5.5.3 CONTAINMENT

5.5.3.1 Active/Passive Containment

1. The containment alternatives consist of the use of barriers or collection points, to prevent soil gas from entering the buildings. The collection alternatives are generally passive, although they may be operated initially under active conditions. These alternatives include:
   - Vertical soil gas barriers (e.g., trenches, slurry walls).
   - Vertical collection wells.

2. To further determine applicability of this technology, the following criteria are used to assess effectiveness in achieving RAOs, ease of implementation and relative cost of soil gas containment.
   - **Effectiveness**: The containment GRA would be effective in reducing the potential exposure to soil gas. Collection and treatment or venting of the subsurface gases would reduce the TMV of the soil gas.
   - **Implementability**: The containment GRAs are generally implementable at the Site. However, this may be affected by specific subsurface conditions (e.g., utilities, debris, existing structures and building designs).
   - **Cost**: The capital costs of the containment alternative are generally low to moderate, but are highly dependent on the extent to which they would be applied.

3. The indoor air containment GRAs are retained for further evaluation.

5.5.3.2 Building Modifications

1. The building modifications are designed to prevent exposure of onsite workers from the accumulation of soil gas within onsite buildings. This can be accomplished using one or more of the following technologies:
   - Improve building ventilation.
   - Positive building pressure.
   - Vents beneath foundations.
   - Floor sealing.
   - Building monitoring and controls.

2. To further determine applicability of these technologies, the following criteria are used to assess effectiveness in achieving RAOs, ease of implementation and relative cost for building modifications:
   - **Effectiveness**: The use of building modifications would be effective in preventing exposure of onsite workers by interrupting the pathway of soil gas into the building.

- **Implementability**: The building modifications can be readily implemented in the onsite buildings. The specific designs would be determined based on the building design.
- **Cost**: The capital costs of the building modifications are considered low and are dependent on the number of buildings and the specific technology implemented.

3. The building modifications GRAs are retained for further evaluation.

5.5.4 TREATMENT

1. Treatment response actions are designed to reduce the toxicity, mobility or volume of the contaminants in the soil and to meet feasibility study objectives. The treatment technology retained for further study is SVE (active/passive) and bioventing.

2. SVE is an in-situ unsaturated zone soil remediation technology in which a vacuum is applied to the soil to induce a flow of air and remove volatile and semivolatile contaminants from the soil. Offgas from the system may be treated to recover or destroy the contaminants depending on local and state air emission regulations. Vertical extraction wells are used at depths of 5 feet or greater and have been successfully applied as deep as 30 feet. Horizontal extraction vents (trenches or horizontal borings) can also be used to accommodate unusual contaminant zone geometry, limited drill rig access or other site-specific factors.

3. Bioventing is an in-situ process which increases the oxygen content in the subsurface soils to enhance biodegradation of hydrocarbons. Bioventing can be accomplished using an active process, similar to SVE, or in a passive mode using atmospheric pressure to increase the oxygen levels in soils.

4. SVE and bioventing target contaminants are VOCs and some fuels. Moisture content, organic content and air permeability of the soil will affect their performance.

5. To further determine the applicability of this technology, the following criteria are used to assess the effectiveness in achieving the RAOs, ease of implementation and relative cost for SVE and bioventing:
   - **Effectiveness**: These technologies would attain risk-based remedial action levels for soil and subsurface sources. They will also achieve a significant reduction in toxicity, mobility and volume of the contaminants

at the Site. A treatability study (TM No. 9A - Soil Vapor Extraction Testing) has been performed and has shown SVE to be effective. SVE can be modified with thermal enhancement to increase the mobility of VOCs and SVOCs.

- **Implementability**: SVE and bioventing are an established remedial practice. Standard construction equipment can be used for well installation and system construction. Previous studies have shown this technology to be implementable at the Site.
- **Cost**: The capital costs of this alternative are low to moderate. Operations and maintenance costs are modified.

6. SVE and bioventing technologies will be retained for further evaluation.

TABLE 5.1

SUMMARY OF GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES AND PROCESS OPTIONS FOR SOILS WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTIONS	TECHNOLOGY TYPES	PROCESS OPTIONS
No Further Action	None	None
Institutional Controls	Administrative Actions, Access Restrictions, Future Development Requirements	Land Use Restrictions, Restrictive Easements, Monitoring, Access Restrictions to Limit Access and Exposure (e.g., signage), Future Development Requirements
Containment	Capping	RCRA or RCRA-Equivalent Cap, Asphalt Cap, Concrete Cap, Monofill (Soil) Cap, Evapotranspiration Cap
	Surface Controls	Grading, Diversion/Collection
Excavation	Excavating Buried Waste	Offsite Disposal, Onsite Consolidation
Treatment • In-Situ Processes	Physical	Vitrification, Soil Washing
	Biological	Bioventing
	Chemical	Solidification/Stabilization
• Ex-Situ Processes - Onsite Treatment and Consolidation - Offsite Treatment and Disposal	Biological	Landfarming/Composting, Biotreatment Cells
	Chemical/Physical	Soil Washing/Solvent Extraction, Solidification/Stabilization
	Thermal	Thermal Desorption
	Incineration	Thermal Combustion

94-256/Rpts/SFS (7/21/00/rn)

TABLE 5.2

SUMMARY OF GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES AND PROCESS OPTIONS FOR SOIL GAS WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTIONS	TECHNOLOGY TYPES	PROCESS OPTIONS
No Further Action	None	None
Institutional Controls	Administrative Actions, Access Restrictions, Future Development Requirements	Land Use Restrictions, Restrictive Easements, Monitoring, Access Restrictions to Limit Access and Exposure (e.g., signage), Future Development Requirements
Containment	Active/Passive Containment	Vertical and Horizontal Barriers and Collection Wells
Treatment	Active/Passive Treatment	Bioventing, Soil Vapor Extraction (SVE)

94-256/Rpts/SFS (7/21/00/rm)

TABLE 5.3

SUMMARY OF GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES AND PROCESS OPTIONS FOR GROUND WATER WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTIONS	TECHNOLOGY TYPES	PROCESS OPTIONS
No Further Action	None	None
Institutional Controls	Administrative Actions, Access Restrictions, Future Development Requirements	Land Use Restrictions, Restrictive Easements, Monitoring, Access Restrictions to Limit Access and Exposure (e.g., signage), Future Development Requirements
Monitoring	Quarterly Ground Water Monitoring	Routine Ground Water Monitoring for COCs
Treatment	Pump of Ground Water with Treatment for COCs	Carbon Adsorption, UV Oxidizing Air Sparging

94-256/Rpts/SFS (7/21/00/rm)

TABLE 5.4

SUMMARY OF GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES AND PROCESS OPTIONS FOR LIQUIDS LOCATED WITHIN AND OUTSIDE THE RESERVOIR BERM WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTIONS	TECHNOLOGY TYPES	PROCESS OPTIONS
No Further Action	None	None
Institutional Controls	Administrative Actions, Access Restrictions, Future Development Requirements	Land Use Restrictions, Monitoring, Access Restrictions to Limit Access and Exposure (e.g., signage), Future Development Requirements
Collection Treatment and Disposal • Active	Recovery Wells	Recovery Well Extraction and Discharge
• Passive	Phytoremediation	Installation of Deep Rooting Vegetation
Containment	Capping	RCRA or RCRA-Equivalent Cap, Asphalt Cap, Concrete Cap, Monofill (Soil) Cap, Evapotranspiration Cap
	Surface Controls	Grading, Diversion/Collection

94-256/Rpts/SFS (7/21/00/mn)

TABLE 5.5

SUMMARY OF GENERAL RESPONSE ACTIONS, TECHNOLOGY TYPES AND PROCESS OPTIONS FOR INDOOR AIR WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTIONS	TECHNOLOGY TYPES	PROCESS OPTIONS
No Further Action	None	None
Institutional Controls	Administrative Actions, Access Restrictions, Future Development Requirements	Land Use Restrictions, Restrictive Easements, Monitoring, Access Restrictions to Limit Access and Exposure, Future Development Requirements
Containment	Active/Passive Containment	Vertical and Horizontal Barriers and Collection Wells
	Building Modifications	Building Monitoring and Controls, Perimeter Gas Collection System (Active/Passive), Foundation Venting, Positive Building Pressure, Floor Sealing
Treatment	Active/Passive Treatment	Bioventing, Soil Vapor Extraction (SVE)

94-256/Rpts/SFS (7/21/00/rm)

TABLE 5.6

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOILS WASTE DISPOSAL, INC. SUPERFUND SITE

RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
No Further Action	Maintain existing conditions	Effective in maintaining existing conditions. However, would not be effective in reducing the volume, toxicity or mobility of COC.	Implementable.	Low cost.	Retain for comparison purposes.
Institutional Controls • Land Use Restrictions • Monitoring • Access Restrictions (e.g., signage)	Restrict land use activities, maintain Site access restrictions, continued monitoring of Site conditions.	Effective in maintaining existing Site conditions and reducing current and future exposure risks. Less effective in protecting public health, welfare and the environment long-term.	Implementable.	Low cost.	Retain as potential remedial technology or to combine with other options.
• Future Development Requirements • Restrictive Easements	Use of city, county, state and federal regulations to require the use of soil gas barriers and restrictions on excavation. State Water Codes give Water Resource Control Board the authority to impose institutional controls. Institutional control details are not listed in the Water Codes. Water Resource Control Board reserves the right to interpolate the Water Codes to implement institutional controls that would protect the general public from contaminated ground water.	Effective in reducing potential future risks to onsite business.	Implementable. However, this must be negotiated with the landowners and tenants.	Moderate cost.	Retain as potential remedial technology or to combine with other options.
Containment • RCRA or RCRA-Equivalent Cap	An engineered cap including the following layers: • Compacted Clay. • Synthetic liners and filters. • Gas collection layer.	Effective in reducing infiltration, and preventing access/exposure to buried waste. Cap would be effective in reducing the mobility of COCs to ground water.	Would be difficult to implement in some areas of the Site. However, it is implementable at locations removed from onsite buildings.	Moderate to high cost.	Retain as potential remedial technology or to combine with other options.
• Concrete or Asphalt Cap	An engineered cap, which may be suitable for parking, storage or building foundation. May be designed to include a gas barrier or collection layer.	Effective in reducing infiltration and preventing access/exposure to buried waste. Caps would be effective in reducing mobility of COCs to ground water. May allow greater flexibility in postclosure site usage.	Implementable. Concrete cap may be more difficult to implement than an asphalt cap.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.

TABLE 5.6

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOILS WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Containment (Cont'd)					
• Monofill (Soil) Cap	An engineered soil cap, placed over the waste areas and compacted to reduce infiltration.	Effective in minimizing infiltration, reducing the potential for access/exposure to buried waste. Cap would be effective in reducing mobility of COCs to ground water.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
• Evapotranspiration Cap	An engineered soil cap which is designed to allow for minimal infiltration of rainfall, which is then allowed to evaporate during drier periods.	Effective in controlling infiltration. Cap would be effective in reducing mobility of COCs to ground water. More applicable to arid climates such as southern California, Arizona and Nevada.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
• Surface Controls	Site grading and stormwater controls to reduce rainfall infiltration.	Effective in reducing infiltration and exposure to buried waste.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
Excavation Reservoir Waste • Offsite Disposal[1]	Excavate nonhazardous materials and dispose in permitted facility (e.g., Class III landfill). Hazardous materials are disposed in a permitted Class I facility. Wastes may require treatment to comply with disposal regulations (e.g., solidification, etc.).	Effective in eliminating long-term risks.	Not implementable due to high risks (e.g., greater odor and VOC emissions anticipated from reservoir wastes than from nonreservoir wastes, high volume of truck traffic going offsite to disposal facility and extended time required to implement complete excavation).	Extremely high cost.	Not retained.
Excavation Nonreservoir Waste • Onsite Consolidation	Excavate and consolidate buried waste onsite. Since reservoir material is already contained, this would apply to buried waste in Areas 1, 4, 5, 6, 7 and 8.	Effective if properly redisposed.	Implementable if odor and VOC emissions are controlled. High volume truck traffic and time required may have community impact on implementability.	Moderate to high costs.	Retain as potential remedial technology or to combine with other options.

(1) Due to excavation issues discussed in Section 5.1.4, offsite disposal will not be retained.

TABLE 5.6

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOILS WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Treatment					
• In-Situ Processes					
- Vitrification	Using electrical current the buried waste is heated to >2,000° F and fused with soil into a glass type material.	Highly effective for metal wastes and soils. Effective in reducing the mobility of COCs.	Not implementable. Not feasible for wastes with >5% total organic material due to high explosion potential.	High cost.	Not retained.
- Soil Washing	Soils are washed by surface application equipment using water, solvent or detergents to dissolve the buried waste. The dissolved waste are then removed by collection wells.	Soil washing has not been shown to be effective using drilling muds or crude oil.	Not readily implementable due to application constraints (e.g., ongoing Site operations).	High cost.	Not retained.
- Bioventing	By increasing the subsurface oxygen levels, aerobic degradation can be enhanced.	Not generally effective for crude oil type wastes or waste with low permeability such as drilling muds. Not effective in treating metals. May be effective in reducing soil gas levels.	Implementable.	Moderate cost.	Not retained.
- Solidification/ Stabilization	Solidification/Stabilization can be used to bind metals into insoluble materials and to absorb organics into a matrix which reduces exposure and leaching potential.	Solidification/stabilization has been shown to be effective in reducing the risk of exposure and leaching at numerous hazardous waste sites.	Excavation of wastes is implementable if odor and VOC emissions are controlled. However, because of space limitations for conducting the ex-situ processes, may not be feasible unless volumes of soil are small.	Moderate to high cost.	Retain as potential remedial technology or to combine with other options.
• Ex-Situ Processes					
- Landfarming/ Composting	Biodegradation using ex-situ landfarming/composting processes to aerobically degrade petroleum hydrocarbons.	Potentially effective in reducing the level of petroleum hydrocarbons in soils. Effectiveness in drilling mud matrix is considered substantially less.	May not be implementable due to excavation related concerns (e.g., high odor and VOCs emissions). Not implementable at the site due to space required and the proximity of residents, high school and onsite businesses unless volumes are small.	Low to moderate cost.	Not retained.
- Biotreatment Cells	Biodegradation using biotreatment cells which control the emissions and allow enhanced reaction rates.	Potentially effective in reducing the level of petroleum hydrocarbons in soils. Effectiveness in drilling mud matrix is considered substantially less.	May not be implementable due to excavation related concerns. Implementation at the Site may be potentially feasible if volumes of soil were small.	High cost.	Not retained.

TABLE 5.6

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOILS WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Ex-Situ Processes (Cont'd)					
- Soil Washing/ Solvent Extraction	Soils are washed using water, solvent or detergents to dissolve the buried waste. The dissolved waste are then separated by filtration and the clean soils reused.	Soil washing has not been shown to be effective using drilling muds or crude oil.	Not readily implementable due to space requirements and the proximity of the high school and community. Implementable at the site if proper odor and emission controls can be achieved to allow excavation.	High cost.	Not retained.
- Solidification/ Stabilization	Solidification/Stabilization can be used to bind metals into insoluble materials, and to absorb organics into a matrix which reduces exposure and leaching potential.	Solidification/stabilization has been shown to be effective in reducing the risks of exposure and leaching at numerous hazardous waste sites. Not effective in preventing direct exposure to buried waste.	May not be implementable due to excavation problems. Implementable at the site if proper odor and emission controls can be achieved to allow excavation.	Moderate to high cost.	Not retained.
- Thermal Desorption	Thermal desorption can be used to remove (distill) hydrocarbons from soil matrices using a rotary kiln. The hydrocarbons are collected from the offgas and destroyed.	Thermal desorption is considered only marginally effective for crude oil containing materials, due to its high boiling point. Not effective in the removal of metals. May not be effective due to the high moisture content in the buried waste.	Implementable at the site only if proper odor and emission controls can be achieved to allow excavation. Requires extensive materials handling.	Moderate to high cost.	Not retained.
- Incineration (Onsite or offsite)	Soils are combusted at temperatures >2,000° F, which destroys the hydrocarbon, forming CO_2 and water. Metals are converted to oxides and are concentrated in the incinerator area.	Effective in reducing hydrocarbon levels in soils.	Not implementable at the site due to permitting issues. Implementable at the site only if proper odor and emission controls can be achieved to allow excavation. Requires extensive materials handling	Very high cost.	Not retained.

TABLE 5.6

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOILS WASTE DISPOSAL, INC. SUPERFUND SITE

(Continued)

RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Ex-Situ Processes (Cont'd)					
• Offsite Treatment and Disposal(2)					
- Landfarming/ Composting	Biodegradation using ex-situ landfarming/composting processes to aerobically degrade petroleum hydrocarbons.	Potentially effective in reducing the level of petroleum hydrocarbons in soils. Effectiveness in drilling mud matrix is considered substantially less.	Implementable if proper odor and emission controls can be achieved to allow excavation.	Extremely high cost.	Not retained.
- Biotreatment Cells	Biodegradation using biotreatment cells which control the emissions and allow enhanced reaction rates.	Potentially effective in reducing the level of petroleum hydrocarbons in soils. Effectiveness in drilling mud matrix is considered substantially less.	Implementable if proper odor and emission controls can be achieved to allow excavation.	Extremely high cost.	Not retained.
- Soil Washing/ Solvent Extraction	Soils are washed using water, solvent or detergents to dissolve the buried waste. The dissolved waste are then separated by filtration and the clean soils reused.	Soil washing has not been shown to be effective using drilling muds or crude oil.	Implementable if proper odor and emission controls can be achieved to allow excavation.	Extremely high cost.	Not retained.
- Solidification/ Stabilization	Solidification/stabilization can be used to bind metals into insoluble materials, and to absorb organics into a matrix which reduces exposure and leaching potential.	Solidification/stabilization has been shown to be effective in reducing the risks of exposure and leaching at numerous hazardous waste sites.	Implementable if proper odor and emission controls can be achieved to allow excavation.	Extremely high cost.	Not retained.
- Thermal Desorption	Thermal desorption can be used to remove (distill) hydrocarbons from soil matrices using a rotary kiln. The hydrocarbons are collected from the offgas and destroyed.	Thermal desorption is considered only marginally effective for crude oil containing materials, due to its high boiling point. Not effective in the removal of metals. May not be effective due to the high moisture content in the buried waste.	Implementable if proper odor and emission controls can be achieved to allow excavation.	Extremely high cost.	Not retained.

(2) Due to the excavation and offsite disposal concerns of the buried waste discussed in Section 5.1.4, Offsite Treatment and Disposal GRAs will not be retained.

TABLE 5.6

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOILS WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Ex-Situ Processes (Cont'd) • Offsite Treatment and Disposal[1] - Incineration	Soils are combusted at temperatures >2,000° F, which destroys the hydrocarbon, forming CO_2 and water. Metals are converted to oxides and are concentrated in the incinerator area.	Effective in reducing hydrocarbon levels in soils.	Implementable if proper odor and emission controls can be achieved to allow operation.	Extremely high cost.	Not retained.

94-256/Rpts/SFS (7/21/00/rm)

[1] Due to the excavation and offsite disposal concerns of the buried waste discussed in Section 5.1.4, Offsite Treatment and Disposal GRAs will not be retained.

TABLE 5.7

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOIL GAS WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
No Further Action	Maintain existing conditions	Effective in maintaining existing conditions. However, would not be effective in reducing the volume, toxicity or mobility of COC.	Implementable.	Low cost.	Retain for comparison purposes.
Institutional Controls • Land Use Restrictions • Monitoring • Access Restrictions (e.g., signage)	Restrict land use activities, maintain Site access restrictions, continued monitoring of Site conditions.	Effective in maintaining existing Site conditions and reducing current and future exposure risks.	Implementable.	Low cost.	Retain as potential remedial technology or to combine with other options.
• Future Development Requirements • Restrictive Easements	Use of city, county, state and federal regulations to require the use of soil gas barriers and restrictions on excavation.	Effective in reducing potential future risks to onsite business.	Implementable. However, this must be negotiated with the landowners and tenants.	Moderate cost.	Retain as potential remedial technology or to combine with other options.
Containment • Active/Passive Containment					
- Vertical Soil Gas Barriers	Vertical soil gas barriers, such as trenches and slurry walls, have been used to prevent the migration of soil gas, and to allow collection.	Vertical gas barrier have been shown to be effective in preventing gas migration by collection of treatment in various landfill conditions.	Implementable but may be limited due to space considerations, as well as underground piping and utilities.	Moderate cost.	Retain as potential remedial technology or to combine with other options.
- Verticai Collection Wells	Vertical collection wells can be used to control the migration of subsurface gases.	Vertical collector wells have been shown to be effective in collecting soil as part of the TM No. 9A Treatability Study.	Implementable.	Moderate cost.	Retain as potential remedial technology or to combine with other options.
- Horizontal Soil Gas Barriers	Horizontal soil gas barriers are commonly used in conjunction with capping of hazardous wastes. A collection layer is installed in the base of the cap to collect the gas and allow its removal and treatment.	Horizontal soil gas barriers have been shown to be effective in various hazardous waste landfill conditions.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.

TABLE 5.7

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOIL GAS WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

GENERAL RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Containment (Cont'd)					
• Building Modifications					
- Monitoring and Controls	Equip selected buildings with monitoring sensors to detect exceedance of methane, benzene and vinyl chloride. The monitors would control either alarm systems or building ventilation controls.	Building monitoring would be effective in preventing exceedances of the building gas standards.	Implementable for methane only. Current proposed ambient air PRGs are below existing monitoring equipment detection limits.	Low to moderate cost.	Not retained.
- Perimeter Gas Collection System	Perimeter gas collection systems including wells or collection trenches can be used to remove soil gas from around buildings.	Perimeter gas collection may be effective in preventing gas migration under buildings. However, it is likely not effective in areas where waste is located under the building.	Implementable.	Moderate to high cost.	Retain as potential remedial technology or to combine with other options.
- Foundation Venting	Gas collection pipes are placed either through the building foundation or horizontal under the building foundation to allow subsurface gases to be vented to the atmosphere or to a treatment system.	Foundation venting has been shown to be effective in the prevention of gas migration into buildings near landfill or waste disposal facilities.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
- Positive Building Pressure	By applying a positive pressure to a building, the infiltration of soil gas into a building can be prevented.	Positive pressure has been used to prevent migration of soil gas into some types of buildings. However, its effectiveness can be affected by the type of building, building age and activities.	Implementable, but will vary depending on the type of building and type of business activities.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
- Floor Sealing	Sealing floors with barrier material, and covering with new flooring.	Highly effective in preventing exposure.	Implementable.	Low cost.	Retain as potential remedial technology or to combine with other options.

TABLE 5.7

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR SOIL GAS WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

GENERAL RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Treatment					
• Active/Passive Treatment					
- Soil Vapor Extraction (SVE)	Soil vapor extraction can be used to remove VOCs and methane from the subsurface.	SVE has been shown to be effective in reducing soil gas concentrations as part of the TM No. 9A Treatability Study.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
- Bioventing	Bioventing is used to increase aerobic degradation by increasing the oxygen content of the soils by increasing biodegradation, the soil gas levels should decrease.	Bioventing has been shown to be effective in reducing soil gas levels associated with gasoline and diesel sites.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.

94-256/Rpts/SFS (7/21/00/rm)

TABLE 5.8

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR GROUND WATER
WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
No Further Action	Maintain existing conditions	Effective in maintaining existing conditions.	Implementable.	Low cost.	Retain for comparison purposes.
Institutional Controls • Land Use Restrictions • Monitoring	Restrict land use activities and continued monitoring of Site conditions.	Effective in maintaining existing site conditions and reducing current and future exposure risks.	Implementable.	Low cost.	Retain as potential remedial technology or to combine with other options.
• Future Development Requirements • Restrictive Easement	Use of city, county, state and federal regulations to require the use of soil gas barriers and restrictions on excavation.	Effective in reducing potential future risks to onsite business.	Implementable. However, this must be negotiated with the landowners and tenants.	Moderate cost.	Retain as potential remedial technology or to combine with other options.
Monitoring	Routine monitoring of Site ground water to assure future conditions.	Effective in maintaining Site conditions and future risks.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or combine with process options.
Treatment					

94-256/Rpts/SFS (7/24/00/jb)

TABLE 5.9

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR LIQUIDS LOCATED WITHIN AND OUTSIDE THE RESERVOIR BOUNDARY WASTE DISPOSAL, INC. SUPERFUND SITE

GENERAL RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
No Further Action	Maintain existing conditions	Effective in maintaining existing conditions. However, would not be effective in reducing the volume, toxicity or mobility of COC.	Implementable.	Low cost.	Retain for comparison purposes.
Institutional Controls • Land Use Restrictions • Monitoring • Access Restrictions (e.g., signage)	Restrict land use activities, maintain Site access restrictions, continued monitoring of Site conditions.	Effective in maintaining existing Site conditions reducing current and future exposure risks.	Implementable.	Low cost.	Retain as potential remedial technology or to combine with other options.
• Future Development Requirements • Restrictive Easements	Use of city, county, state and federal regulations to require the use of soil gas barriers and restrictions on excavation.	Effective in reducing potential future risks to onsite business.	Implementable. However, this must be negotiated with the landowners and tenants.	Moderate cost.	Retain as potential remedial technology or to combine with other options.
Collection • Active - Recovery Wells	As part of final remediation, leachate collection points (LCPs), such as recovery wells, are installed to allow limited collection and monitoring of subsurface liquids.	Effective in monitoring liquids control and in reducing subsurface liquids.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
• Passive - Phytoremediation	The use of plants and trees to remove subsurface liquids.	Vegetation can be effective in controlling subsurface liquids.	Implementable. However, time required for tree growth and liquids removal is significant.	Low to moderate cost.	Not retained.

TABLE 5.9

SCREENING OF POTENTIAL REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS FOR LIQUIDS LOCATED WITHIN AND OUTSIDE THE RESERVOIR BOUNDARY WASTE DISPOSAL, INC. SUPERFUND SITE (Continued)

GENERAL RESPONSE ACTION PROCESS OPTION	DESCRIPTION	EFFECTIVENESS	IMPLEMENTABILITY	COST	SCREENING COMMENTS
Containment					
• RCRA or RCRA-Equivalent Cap	An engineered cap including the following layers: • Compacted clay. • Synthetic liners and filters. • Gas collection layer.	Effective in reducing infiltration, and preventing access/exposure to liquids. Cap would be effective in reducing the volume and mobility of Site liquids.	Implementable.	Moderate to high cost.	Retain as potential remedial technology or to combine with other options.
• Concrete or Asphalt Cap	An engineered cap, which may be suitable for parking, storage or building foundation. May be designed to include a gas barrier or collection layer.	Effective in reducing infiltration and preventing access/exposure to liquids. Cap would be effective in reducing the volume and mobility of liquids. May allow greater flexibility in postclosure site usage.	Implementable. Concrete cap may be more difficult to implement than an asphalt cap.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
• Monofill (Soil) Cap	An engineered soil cap, placed over the waste areas and compacted to reduce infiltration.	Effective in minimizing infiltration reducing the potential for access/exposure to liquids. Cap would be effective in reducing the volume and mobility of liquids.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.
• Evapotranspiration Cap	An engineered soil cap which is designed to allow for minimal infiltration of rainfall, which is then allowed to evaporate during drier periods.	Effective in controlling infiltration. Cap would be effective in reducing the volume and mobility of liquids. More applicable to arid climates such as southern California.	Implementable.	Low to moderate cost.	Retain as potential remedial technology or to combine with other options.

94-256/Rpts/SFS (7/21/00/rm)

TABLE 5.10

INSTITUTIONAL CONTROLS
WASTE DISPOSAL, INC. SUPERFUND SITE

NUMBER	SITE CONTROL[1]	TYPE OF IC[2]	APPLICABLE AREAS	METHOD OF IMPLEMENTATION[3]
REMEDY COMPONENT PROTECTION[4] General Restriction: The remedy components including, but not limited to, the cap, soil gas control equipment, monitoring wells, and in-door air monitoring equipment, are not to be interfered with.				
1.	Allow placement of warning signs or other posted site information and, once posted, do not remove or interfere with.	Generic	All	Easement and Physical Restraint
2.	Allow placement of site access controls, e.g., gates or fencing, and do not damage or circumvent the remedy components.	Generic	All	Easement and Physical Restraint
3.	Uses of the property, including new development, must not interfere with or affect the integrity of the cap and other remedy components.	Generic	All	Easement
4.	Construction over a remedial cap should not be done without the concurrence of the site custodian.[5]	Generic	Capped Areas	Easement
5.	No interferences with or alterations to the grading, vegetation and surface water and drainage controls should be made.	Generic	All	Easement
6.	Portions of the property underlain by buried wastes should not be regraded.	Specific	Capped Areas	Easement, Zoning and Physical Restraint
7.	Areas of asphalt or concrete pavement should not be removed or improved without the concurrence of the site custodian.	Specific	Capped Areas	Easement, Zoning and Physical Restraint
8.	No penetrations (e.g., utility trench excavations, excavations for fence posts, excavations for planting trees or large bushes, foundation excavations, foundation piles, etc.) or interferences with the cap or any other areas with remedial controls should be made.	Generic	All	Easement, Zoning and Physical Restraint
9.	Deep-rooting plants (i.e., plants whose root systems will penetrate more than about 2 feet deep) should not be planted.	Specific	Capped Areas	Easement and Physical Restraint
10.	Settings of irrigation controls should not be changed.	Specific	Capped Areas	Easement and Physical Restraint
11.	Drainage channels or pipes should not be blocked, rerouted or otherwise interfered with.	Generic	All	Easement, Zoning and Physical Restraint
12.	For buildings located over buried wastes, or in soil gas noncompliance areas no new openings should be made in building floor slabs.	Generic	All	Easement and Physical Restraint
13.	Maintain integrity of existing and future foundations in areas underlain by waste and in soil gas noncompliance areas; report or repair cracks or damage.	Specific	1, 2, 5, 8 and Future Construction	Easement
14.	Indoor gas controls should not be circumvented.	Generic	All	Easement and Physical Restraint

TABLE 5.10

INSTITUTIONAL CONTROLS
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

NUMBER	SITE CONTROL[1]	TYPE OF IC[2]	APPLICABLE AREAS	METHOD OF IMPLEMENTATION[3]
15.	Indoor gas sensors or alarms should not be turned off or interfered with.	Generic	All	Easement and Physical Restraint
16.	Soil gas control systems or alarms should not be turned off or interfered with.	Generic	All	Easement and Physical Restraint
17.	Monitoring points (e.g., ground water monitoring wells, soil gas probes, reservoir leachate collection wells, soil gas vents, survey monuments) should not be blocked or otherwise obstructed.	Generic	All	Easement, Zoning and Physical Restraint
18.	Do not open or place anything into monitoring wells.	Generic	All	Physical Restraint
19.	Liquids recovery system, liquids treatment system and treated liquids storage facilities should not be turned off or interfered with.	Specific	All	Easement
20.	Ground water supply or monitoring wells should not be constructed.	Generic	All	Easement, Zoning and Physical Restraint
SITE ACCESS Landowners shall allow site access to the real property, including to the onsite buildings, to: (1) install, monitor and maintain liquid, ground water, soil gas and other wells or probes; (2) install, monitor and operate any monitoring or extraction system including liquids and soil gas extraction systems; and (3) conduct any other inspections, monitoring, remediation, operations and maintenance.				
21.	Allow property access, including access to existing and new buildings or structures, for inspections and monitoring for compliance with easements; monitoring; and installation, maintenance and operation of remedial measures, including signs and access controls. This institutional control also applies to new buildings constructed at the Site. Landowners shall allow site access to implement any response actions determined necessary by EPA and the state.	Generic	All	Easement
22.	Landowners must disclose all institutional controls to tenants.	Generic	All	Easement
23.	Landowners must disclose tenants to site custodian.	Generic	All	Easement
PROPERTY RESTRICTIONS Construction, including new buildings, adding-on to existing buildings, renovation or retrofitting of existing structures or other improvements, excavation of soils, and grading or alteration of surface soils may only be done with the approval of the site custodian and must be done in a manner protective of human health and the environment.				
24.	During construction, excavation or grading of any type, measures shall be taken to assure that there is no offsite migration of dust, odors or organic vapors. During such activities, measures, as appropriate, shall be taken to protect the health and welfare of onsite personnel or workers and to prevent offsite impacts.	Generic	All	Easement

TABLE 5.10

INSTITUTIONAL CONTROLS
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

NUMBER	SITE CONTROL[1]	TYPE OF IC[2]	APPLICABLE AREAS	METHOD OF IMPLEMENTATION[3]
25.	Construction of any type requires compliance with City of Santa Fe Springs regulations and zoning requirements[6], especially those pertaining to methane gas protection and building appearance (landscaping, etc.).	Generic	All	Zoning/Easement
26.	Obtain approval for building or site modifications from site custodian.	Generic	All	Zoning/Easement
27.	Excavation of waste materials may be permitted only upon the approval and under the supervision of the site custodian.	Generic	All	Easement
28.	New construction must have the approval of the site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of construction. These efforts, along with site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of the site custodian.	Generic	All	Easement
29.	Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the site custodian.	Generic	Capped Areas	Easement
30.	Construction workers should be provided with appropriate personal protective equipment while working at the site.	Generic	All	Easement
31.	Pesticides or herbicides should not be applied to the capped areas or areas surrounding monitoring points. Similarly, do not dispose of used or excess chemicals illegally or improperly.	Specific	Capped Areas	Easement, Zoning and Physical Restraint
32.	Comply with Waste Discharge regulations and DTSC hazardous waste disposal requirements.	Generic	All	Zoning/Easement
33.	Comply with Underground Storage Tank (UST) Regulations, if there are USTs on the property.	Generic/Specific	All/Area 7	Zoning/Easement
34.	If there is a septic tank system on site, discontinue use and decommission in accordance with local regulations.	Generic/Specific	All/Area 7	Zoning/Easement

TABLE 5.10

INSTITUTIONAL CONTROLS
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

NUMBER	SITE CONTROL(1)	TYPE OF IC(2)	APPLICABLE AREAS	METHOD OF IMPLEMENTATION(3)
35.	Provide title disclosure on transfer (indicating easements). Notify EPA, DTSC and site custodian of the property transfer. All property restrictions must be included in deeds, leases, assignments or other transfers of interest.	Generic	All	Easement
36.	The Site should not be used or redeveloped for residential, hospital, school for people aged 21 or under, day care center or other uses by sensitive receptors including similar uses by owners or operators as part of Site supervision or as an employee at the facility.	Generic	All	Easement

94-256/Rpts/SFS (7/24/00/jb)

(1) The above list of Institutional Controls is not intended to be exclusive, and additional institutional controls may be required as necessary in the future.

(2) Generic Institutional Controls are defined as those controls that are applicable to the entire Site. Specific Institutional Controls are defined as those controls that are applicable to specific areas of the Site.

(3) The methods of implementation are defined as follows:
- Physical Restraint: Physical actions to restrict access to all or portions of the Site, through fencing, locks or other methods to prevent trespassing.
- Zoning: Local government zoning and land use controls (e.g., zone for commercial/industrial land use only).
- Restrictions: Restrictive covenants, servitudes and easements to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use or consumptive use of ground water.

(4) Remedy component protection site controls are intended to insure that actions taken to remediate the site and protect human health and the environment will continue to function as intended. They are not intended to prevent future development of the property. New construction can be allowed at the Site provided it is done such that human health and the environment will continue to be protected, and the terms of the restrictions, covenants, easements and/or servitudes are not violated.

(5) The site custodian is the party responsible for operating and maintaining the remedy components and monitoring system. Actions requiring the site custodian's notification and/or approval may not proceed without notification to and approval by EPA and DTSC.

(6) Santa Fe Springs Ordinance No. 829 specifying methane controls in specified areas.

TABLE 5.11

SUMMARY OF SANTA FE SPRINGS ZONING ORDINANCES
M-1 AND M-2
WASTE DISPOSAL, INC. SUPERFUND SITE

ZONING	ORDINANCE	TITLE	DESCRIPTION	COMMENT
MW-1 (Light Manufacturing Zone District)	155.210	Purpose	Provide M-1 manufacturing zones and to foster concentration of these areas.	
	155.211	Principal Permitted Uses	Provide a list of acceptable uses including machine shops, equipment rentals, professional offices, bulk petroleum storage.	Institutional controls may need to be modified to restrict the type of site business allowed to be compatible with site remedies.
	155.212	Accessory Uses	Allows for dwelling for supervision, and recreational facilities or horse facilitation.	May need to be amended to prohibit onsite dwelling or other long-term exposure type facilities. ICs may need to be modified to prohibit onsite dwellings or recreational facilities.
	155.213	Conditional Uses	Allows for educational or recreational use, oil and gas exploration, steel production, convenience stores and vehicle testing facilities.	May need to be amended to restrict conditional uses onsite.
	155.214	Project Development Standards	Must comply with 155.445 through 155.463.	
	155.215	Lot Areas, Width, Depth	Specifies lot frontage and 70-foot buffer between schools or residences.	
	155.216	Population Density	Residential uses are not permitted in the M-1 zone.	
	155.217	Building Height	No structures of >50 feet height.	
	155.218 - 155.231	Aesthetic Considerations	Established standards for yard sizes, encroachments, fencing and signs.	
M-2 Heavy Manufacturing Zone District	155.240	Purpose	Protection of heavy industrial property, to prevent encroachment by residential housing.	
	155.241	Principal Permitted Uses	Provide a list of acceptable uses including the M-1 uses above. Include manufacturing, contractor shops. Foundry's Truck Service and Repair.	Institutional controls may need to be modified to restrict the type of site business allowed to be compatible with site remedies.
	155.242	Accessory Uses	Allows for dwelling for supervision, and recreational facilities or horse facilitation.	May need to be amended to prohibit onsite dwelling or other long-term exposure type facilities. ICs may need to be modified to prohibit onsite dwellings or recreational facilities.
	155.243	Conditional Uses	Allows conditional use for manufacturing of gases, chemicals, storage of over 100,000 gallons of flammable liquids, ammunition and salvage of vehicles, or animal processing.	ICs may need to be modified to be compatible with site remedies.

TABLE 5.11

SUMMARY OF SANTA FE SPRINGS ZONING ORDINANCES
M-1 AND M-2
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ZONING	ORDINANCE	TITLE	DESCRIPTION	COMMENT
M-2 Heavy Manufacturing Zone District (Continued)	155.243 (Continued)	Conditional Uses (Continued)	Allows for educational or recreational use, oil and gas exploration, steel production, convenience stores and vehicle testing facilities.	May need to be amended to prohibit onsite dwelling or other long-term exposure type facilities. ICs may need to be modified to prohibit onsite dwellings or recreational facilities.
	155.244	Property Development Standards	Must comply with 155.445 through 155.463.	
	155.245	Lot Area, Width and Depth	Specifies lot frontage and 70-foot buffer between schools or residences.	Specifies lot frontage and 70-foot buffer between schools or residences.
	155.246	Population Density	Residential uses are not permitted in the M-2 zone.	
	155.247	Building Height	No structures of >50 feet in height.	
	155.248 - 155.261	Aesthetic Consideration	Established standards for yard sizes, encroachments, fencing and signs.	

94-256/Rpts/SFS (7/24/00/jb)

6.0 ASSEMBLY AND DEFINITION OF REMEDIAL ALTERNATIVES

1. The assembly of remedial alternatives is required because most remedial technologies deal with specific media or have limited overall effectiveness. Individual technologies were screened in Chapter 5.0 to optimize overall effectiveness and practicability based on their effectiveness, implementability and cost. Remedial technologies that were retained after screening are assembled and defined into Site-wide remedial alternatives as described in Section 6.2.

2. The remedial technologies, as part of the assembly in alternatives, are further screened based on long-term and short-term effectiveness and their ability to achieve RAOs on an area basis. Cost ranges for each alternative are presented in this chapter.

3. Since no one technology or combination of alternatives can completely remediate the Site without presenting unnecessary risks, institutional controls are included in each of the alternatives developed.

4. It should be noted that there are a multitude of combinations of technologies that can be created for addressing remediation of the Site. An effort has been made to show a range of Site-wide options, their costs and explain the choice of alternatives. These Remedial Actions assemblies have been developed based on the Site conditions, the results of the analyses presented in Chapter 5.0 and the NCP criteria.

6.1 IDENTIFICATION AND SCREENING OF SITE-WIDE REMEDIAL ALTERNATIVES

6.1.1 REMEDIAL ALTERNATIVES FOR SOILS

1. The following alternatives have been developed for the contaminated soils at the Site. The alternatives for the soils at the Site are designated with the letter "S." These media alternatives are described in the following sections, and summarized in Table 6.1.

6.1.1.1 <u>S-1 No Further Action</u>

1. Although not considered a remedial technology, the No Further Action alternative has been included here for comparison purposes. No Further Action, as presented herein, implies that further remedial actions would not be taken.

2. The No Further Action alternative, as required by the NCP, must be considered in Remedial Action evaluation and is retained to provide a basis for comparison with other actions. This alternative consists of not having additional soil remedial activities at the Site. The No Further Action alternative does not assure that the existing risk levels or long-term risks will remain within acceptable limits.

3. Under Alternative S-1, No Further Action, actions will not be taken at the Site, except continued ground water monitoring.

4. Alternative S-1 was retained for detailed analysis.

6.1.1.2 S-2 Institutional Controls

1. Alternative S-2 consists of implementing institutional controls at the Site, to restrict certain activities by land owners and tenants, which may lead to exposure of contaminated soils. Institutional controls may include one or more of the following:
   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.
   - Local governmental zoning and land use controls. Examples of these types of controls could include:
     - Zoning restricts land use to commercial/industrial land use.
     - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
     - Requiring the landowner to obtain approval for building or Site modifications from EPA, the Department of Toxic Substances Control (DTSC), and Site custodian.
   - Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
     - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are

discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.

  - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.

- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The institutional controls GRA may be effective in preventing exposure to some COCs. Institutional controls can also prevent direct exposure to soils by the general public. Short-term risks are reduced by institutional controls regulating exposure pathways. The long-term effectiveness and performance of institutional controls is dependent on the enforcement of the controls and deed restrictions. By controlling Site activities such as excavation and construction of new buildings, the future risks can also be reduced. Institutional controls would not reduce the TMV of COCs.

3. Institutional controls would likely impact onsite businesses with underlying wastes or adjacent to underlying waste. These would include Area 1, Area 5 (9843 Greenleaf) and Area 8.

4. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:

   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - California Health and Safety Code (CHSC) Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - California Civil Code (CCC) Sections 1457-1471, with specific reference to restrictive environmental covenants.

The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

5. Alternative S-2 was retained for detailed analysis.

6.1.1.3 S-3 Containment

1. The containment (i.e., capping) GRA for buried waste could be implemented by constructing a cap over areas where the buried waste poses a health risk. The two primary objectives of the containment remedial technology are to reduce surface water infiltration, and to prevent direct contact with the buried waste. In addition, capping will control soil erosion, and reduce or control air emissions and odors. The reduction of surface water infiltration by a cap will minimize the potential leaching of contaminants contained in, or associated with, buried waste situated above the water table. This results in further reducing the potential for migration of contaminants into the ground water and surrounding soil.

2. The following section describes the various containment alternatives for soils at the Site.

6.1.1.3.1 S-3A RCRA/RCRA-Equivalent Capping

1. The typical multimedia RCRA or RCRA-equivalent cap would consist of an engineered system of geosynthetic and earthen materials designed to prevent direct exposure to buried waste and to minimize surface water infiltration. The primary difference between a RCRA cap versus a RCRA-equivalent cap is the thickness of the layers (e.g., clay layer), which typically are much thicker in the RCRA cap. The proposed RCRA-equivalent cap would be equivalent in performance to that of a RCRA cap.

2. For purposes of the SFS evaluation, the following RCRA/RCRA-equivalent cap configuration, from the top down, has been assumed:
   - A 2-foot-thick vegetative layer or an 8- to 14-inch-thick (including base course) asphalt pavement layer.
   - A 60-mil-thick high density polyethylene (HDPE) geomembrane barrier layer.
   - A single-sided geocomposite gas collection layer.
   - A 2-foot-thick foundation layer.

3. A RCRA or RCRA-equivalent cap would be effective for preventing direct exposure to buried waste. It would not reduce the volume or toxicity of COCs. Of the containment alternatives for soils, a RCRA or RCRA-equivalent multimedia cap would result in the lowest amount of surface water infiltration and therefore the lowest potential for COCs to migrate to ground water. RCRA or RCRA-equivalent capping provides adequate effectiveness and permanence, while long-term O&M activities are properly carried out. Short-term risks would be minimal during implementation of a RCRA or RCRA-equivalent cap. Hazardous waste caps have been shown to be highly effective and easily maintained at numerous sites.

4. The RCRA or RCRA-equivalent cap is considered applicable to the following Site areas:
   - Reservoir.
   - Area 2.
   - Area 4.
   - Area 7.

   The RCRA or RCRA-equivalent cap is not considered applicable to Areas 1 and 8 due to the proximity of buildings, and engineering problems presented by the cap.

5. The estimated costs for RCRA/RCRA-equivalent capping of the Site range from $1.17 million to $2.51 million, as shown in Table 6.1.

6. The RCRA/RCRA-equivalent cap is retained for detailed analysis.

6.1.1.3.2 S-3B Concrete or Asphalt Capping

1. Concrete or asphalt could also be used to cap the Site. This engineered cap may be suitable for parking, storage or building foundations. It could also be designed to include a gas barrier or collection layer. An asphalt or concrete cap would consist of the following components (from bottom to top):
   - Foundation layer.
   - Gas collection layer.
   - Base course layer.
   - Low permeability layer (asphalt or concrete).

   The use of an asphalt cap is relatively common, although not as frequent as the RCRA or RCRA-equivalent cap types. The use of concrete caps is considerably less common, primarily due to its cost. However, when concurrently used as a building foundation, it can be considerably more cost-effective.

2. An asphalt or concrete cap would be effective for permanence, while long-term O&M activities are properly carried out, i.e., the wearing surface of the asphalt is maintained or replaced regularly, preventing direct exposure to buried waste in soils and in reducing the mobility of COCs to ground water. Capping with asphalt or concrete would not reduce the volume or toxicity of COCs. Short-term risks may be slightly increased if excavation for foundations is required in areas of waste. However, these risks can be mitigated using standard odor and VOC emission controls. Hazardous waste caps utilizing asphalt and concrete have been shown to be highly effective and easily maintained at numerous sites.

3. For purposes of the FS evaluation the following areas are considered applicable for the use of a concrete or asphalt cap:
   - Reservoir Area.
   - Areas 1, 2, 4, 5, 6, 7 and 8.

4. Estimated costs for asphalt capping of the above areas are $1.09 million to $2.33 million, as shown in Table 6.1.

5. The asphalt/concrete cap is retained for detailed analysis.

6.1.1.3.3 S-3C Monofill Soil Cover

1. A monofill cap is an engineered soil cap placed over the waste areas and compacted to reduce infiltration. The monofill cap is designed to prevent access to the waste by increasing the depth to waste. Surface water infiltration can be significantly reduced or eliminated, especially in an arid climate such as southern California. A monofill cap at the site would be placed over areas where buried waste exists. The monofill cap would have a variable thickness ranging from 1 to 2 feet to allow flexibility for grading around existing buildings. The 1- to 2-foot thickness would be adequate to allow some wear to occur between maintenance episodes while still providing adequate protection against direct exposure to the underlying soils. The wearing surface (the exposed soil layer) could include a marker layer such as geosynthetic netting to help determine when maintenance is required to preserve the minimum thickness of the design specifications.

2. A 5- to 10-foot-thick layer of fill material already exists over portions of the Site which could be left in place to serve as a monofill cap. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} cm/sec

(TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 to 6 feet of the fill soils is typically free of significant quantities of construction debris. The existing fill material typically satisfies the performance requirements for a monofill cap (i.e., it has low permeability and will minimize infiltration of surface water; promote drainage and [with suitable vegetation] minimize erosion; accommodate settling and subsidence; and function with a minimum of maintenance). During design and construction of the monofill cap, the existing fill material will be analyzed at a frequency intended to assure that it complies with the requirements for a monofill cap. Areas found to be out of compliance (e.g., fill material contaminated with construction debris or COCs, highly permeable material, etc.), would be removed and replaced with a minimum thickness of acceptable material. The minimum acceptable thickness of the monofill cap will be determined during design.

3. A monofill cap would be effective for preventing direct exposure to COCs in soils and reducing surface water infiltration, while long-term O&M activities are properly carried out. It would also significantly reduce the potential mobility of COCs to ground water. A monofill cap would not reduce the volume or toxicity of COCs. Short-term risks would be minimized or limited since waste would be minimally disturbed during implementation. Monofill caps have been shown to be highly effective and easily maintained at numerous Sites.

4. For purposes of the FS evaluation, the following areas are considered applicable for the use of a monofill cover:
   - Reservoir.
   - Area 2, 4 and 6.
   - Portions of areas 1, 5, 7 and 8.

5. Estimated costs for a monofill soil cover in the above areas range from $0.86 million to $1.84 million, as shown in Table 6.1.

6. The monofill soil cover, Alternative S-3C is retained for detailed analysis.

6.1.1.4 <u>S-4 Excavation</u>

1. Excavation is not a stand alone technology, and must be combined with other measures. Further, excavation of the reservoir itself has been shown to be infeasible as discussed in Section 5.1.4.1.

2. As indicated in Chapter 5.0, treatment alternatives were not identified for the excavated soils as implementable or cost-effective. Therefore to manage excavated soils, they would be redisposed onsite in conjunction with a capping alternative as discussed below. Offsite disposal of large volumes of soils has also been shown to be too costly. However, offsite disposal of some materials may occur, as part of the actual remedial alternative depending on the volumes and design requirements.

6.1.1.4.1 S-4A Excavation of Wastes from Adjacent to Buildings in Areas 5, 8 and the West Corner of Area 2

1. Approximately 4,700 yd^3 of waste material adjacent to buildings in Areas 5, 8 and the west corner of Area 2 would be excavated and consolidated beneath the cap constructed over the reservoir. The sizes of these excavations would be much smaller than the size of the excavation described in the following sections. The concentrations of COCs in these areas are also generally less than those found in the reservoir. Therefore, an excavation dome is not expected to be required for excavating these areas. Other safety measures may include shoring to maintain support for structures and pavements adjacent to the excavations. Direct exposure to buried waste and exposure to COCs from air emissions during excavation activities could be a significant health concern for remediation workers and employees working in the adjacent buildings. Emissions would be monitored and controlled using typical VOC and odor control measures (i.e., water, foams, etc.). Remediation workers would be required to utilize PPE to minimize exposure (e.g., Level "C" or Level "B" with supplied air). In addition, building occupants may have to be relocated while the work is being performed.

2. Short-term effectiveness would be decreased because of exposure of the wastes due to excavation and transfer to the reservoir. Long-term effectiveness of this alternative is largely governed by the effectiveness of subsequent disposal methods. Adequate long-term effectiveness would be provided as long as O&M activities are properly carried out.

3. Estimated costs for excavation of waste material adjacent to buildings in Areas 5, 8 and the west corner of Area 2 range from $1.29 million to $2.77 million, as indicated in Table 6.1.

4. Alternative S-4A, excavation of waste material adjacent to buildings in Areas 5, 8 and the west corner of Area 2 with onsite redisposal is retained for detailed evaluation.

6.1.1.4.2 S-4B Excavation of Areas 1, 6 and 8

1. The excavation of Areas 1, 6 and 8 wastes is similar to excavating wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2. The concentrations of COCs at these areas are lower than those found in the reservoir. Therefore, an excavation dome may not be required for excavating these areas. Other safety measurements for excavating the material will be taken at Areas 1, 6 and 8, including VOC controls and shoring where necessary. Direct exposure to buried waste and COCs from air emissions during excavation activities would be a significant health concern for remediation workers, onsite businesses and offsite populations. Excavation of these wastes would increase short-term risks. Emissions would be monitored and controlled using water sprays and foams or using an enclosed tent structure with an air treatment system if emissions were higher than could be controlled using water and foam sprays. Remediation workers would be required to utilize PPE to minimize exposure (e.g., level "C" or level "B" supplied air).

2. Long-term effectiveness of this alternative is largely governed by the effectiveness of subsequent disposal methods. Redisposal of the waste onsite under a cap would slightly increase the potential exposure risks in the short-term period via air emissions during the remediation action and during placement of the material under the cap.

3. Estimated costs for excavation of Areas 1, 6 and 8 range from $1.45 million to $3.11 million, as shown in Table 6.1. However, implementation of this alternative is highly dependent on the land owners and the level of cooperation received. Costs for this alternative may be highly variable do to transaction and legal costs associated with obtaining access, business closures and in repairing or replacing onsite buildings damaged due to excavation activities.

4. Alternative S-4B, excavation of Areas 1, 6 and 8 wastes with onsite redisposal is retained for detailed analysis.

6.1.1.4.3 S-4C Excavation of Areas 1, 4, 5, 6, 7, 8 and west corner of Area 2

1. The excavation of waste material from Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2 is similar to excavating waste from Areas 1, 6 and 8. However, the sizes of these excavations would be much greater than the sizes of the excavations described in the previous section. The concentrations of COCs in these areas are generally less than those found in the reservoir. Therefore, an excavation dome may not be required for excavating these areas. Other safety measures may include shoring to maintain support for structures and pavements adjacent to

the excavations. Direct exposure to buried waste and exposure to COCs from air emissions during excavation activities could be a significant health concern for remediation workers, onsite businesses and offsite populations. Emissions would be monitored and controlled using typical VOC and odor control measures (i.e., water, foams, etc.). Remediation workers would be required to utilize PPE to minimize exposure (e.g., Level "C" or Level "B" with supplied air). In addition, building occupants may have to be relocated while the work is being performed.

2. Short-term effectiveness would be decreased due to exposure of the wastes due to excavation and transfer to the reservoir. Long-term effectiveness of this alternative is largely governed by the effectiveness of subsequent disposal methods. Adequate long-term effectiveness would be provided as long as O&M activities are properly carried out.

3. Estimated costs for excavation of waste material from Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2 range from $5.67 million to $12.15 million, as indicated in Table 6.1. However, implementation of this alternative is highly dependent on the land owners and the level of cooperation received. Costs for this alternative may be highly variable due to transaction and legal costs associated with obtaining access, business closures and in repairing or replacing onsite buildings damaged due to excavation activities.

4. Alternative S-4C, excavation of waste material from Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2 with onsite redisposal is retained for detailed evaluation.

6.1.2 REMEDIAL ALTERNATIVES FOR SOIL GAS

1. The GRAs considered for the Site soil gas include institution controls, containment and treatment. The soil gas alternatives are described in the following sections and summarized in Table 6.2. These alternatives for soil gas remediation are labeled with the letters "SG."

6.1.2.1 Remedial Alternative SG-1: No Further Action

1. Remedial Alternative SG-1 is the No Further Action GRA. Although not considered a remedial technology under the NCP, No Further Action implies that further remedial actions would not be taken. The No Further Action GRA has been included for comparison purposes.

2. The No Further Action GRA would not be effective in preventing future direct exposure to COCs in soil gas. It would not reduce the TMV of COCs. This alternative is implementable because it would have a substantially low cost, but it would not be considered cost-effective.

3. Costs for Remedial Alternative SG-1 are zero as no further action will be taken.

4. The No Further Action GRA is retained to provide a basis for comparison of other alternatives.

6.1.2.2 Remedial Alternative SG-2: Institutional Controls

1. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:
   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.
   - Local governmental zoning and land use controls. Examples of these types of controls could include:
     - Zoning restricts land use to commercial/industrial land use.
     - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
     - Requiring the landowner to obtain approval for building or Site modifications from EPA, the DTSC, and Site custodian.
   - Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
     - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are

discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.
  - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.
- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:
   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - CHSC Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - CCC Sections 1457-1471, with specific reference to restrictive environmental covenants.

   The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

3. Estimated costs for institutional controls are highly dependent on costs to obtain the institutional controls. Estimated costs for the institutional controls Alternative SG-2 range from $0.11 million to $0.22 million, as shown in Table 6.2.

4. The institutional control alternative is retained for detailed analysis because it provides a mechanism to control current and future activities at the Site and exposure to waste material by regulating Site access.

6.1.2.3 Remedial Alternative SG-3: Vertical Soil Gas Barriers

1. Remedial Alternative SG-3 is vertical soil gas barriers. Vertical soil gas barriers, such as slurry walls, FMLs, and trenches have been used to prevent and control migration of soil gas. Slurry walls have been routinely used at landfills and other sites to form a gas barrier. Under most circumstances, the side of the slurry wall exposed to the soil gas is vented or contains a collection system to prevent the build-up of soil gases, although this is not always necessary.

2. The long-term effectiveness and permanence of a soil gas barrier is unknown given the Site conditions. However, soil gas barriers have generally shown adequate long-term performance in similar usage conditions. This alternative is generally implementable at the Site. However, the implementability is affected by unknown subsurface materials and conditions. Vertical soil gas barriers are considered a high cost alternative ranging in cost from $3.8 million to $4.97 million for the perimeter of Areas 2 and 8, as shown in Table 6.2.

3. Based on the current Site conditions and the high cost, vertical soil gas barriers were eliminated from further consideration.

6.1.2.4 Remedial Alternative SG-4: Horizontal Soil Gas Barriers

1. Remedial Alternative SG-4 is horizontal soil gas barriers. They are generally used in conjunction with capping. A collection layer is installed at the base of the cap to collect the gas and allow for its removal and treatment. The collection layer generally consists of a highly permeable layer of gravel or a geocomposite with a network of perforated collector pipes. The pipes are connected to various collection points, which are then brought out through the cap to an active or passive gas extraction system.

2. The use of horizontal soil gas barriers would achieve the required long-term effectiveness and permanence by removing soil gas constituents for treatment and discharge. This alternative is implementable with a variety of cap types. Gas collection layers have been routinely installed in caps and present minimal constructibility issues. The installation of horizontal soil gas barriers is relatively low in cost and is highly cost-effective.

3. Short-term risks would be minimized for this alternative since waste would not be disturbed during installation.

4. Estimated costs for horizontal soil barriers under the reservoir cap range from $0.08 million to $0.17 million as shown in Table 6.2.

5. Horizontal soil gas barriers are retained for detailed analysis.

6.1.2.5 <u>Remedial Alternative SG-5: Soil Vapor Extraction</u>

1. Remedial Alternative SG-5 is SVE. SVE removes volatile and some semivolatile contaminants from the soil by applying a vacuum to induce a flow of air. Offgas from the system may be treated to destroy the contaminants or released to the atmosphere depending on the constituents and concentrations.

2. The use of SVE would not provide long-term effectiveness or permanence in areas where buried waste is located, since the source of the soil gas would likely remain untreated. In areas outside the buried waste, SVE may provide long-term effectiveness and permanence by extracting and destroying volatile constitutents. SVE is implementable at the Site based on the TM No. 9A SVE Treatability Study data. For comparison purposes, the costs for SVE are relatively low. Estimated costs for SVE range from $0.11 million to $0.23 million for an area as shown in Table 6.2.

3. SVE would increase short-term risks at the Site only slightly, since minimal waste would be disturbed during collection well installation.

4. SVE is therefore retained for detailed analysis for the control of soil gas in areas that exceed the soil gas standards at the Site perimeter, or areas adjacent to buildings.

6.1.2.6 <u>Remedial Alternative SG-6: Bioventing</u>

1. Remedial Alternative SG-6 is bioventing. Bioventing is an in-situ process, which increases the oxygen content in the subsurface soil to enhance biodegradation of hydrocarbons. By increasing the oxygen content, anaerobic degradation can be retarded and methane production decreased. Bioventing target contaminants are VOCs and some hydrocarbons. Moisture content, organic content and air permeability of the soil will affect the performance.

2. Bioventing would potentially achieve long-term effectiveness and permanence by reducing the soil gas levels; and decreasing methane generation by reducing subsurface anaerobic

conditions. Further, bioventing may degrade some portion of the subsurface petroleum hydrocarbons. However, data is not available to predict the level of degradation that would occur or the length of time it may require. Bioventing is implementable at the Site based on the TM No. 9A SVE Treatability Study data. Implementation may be affected by the specific area conditions, proximity to active businesses and subsurface conduits or debris. For comparison purposes, the estimated costs for bioventing are relatively low, ranging from $0.07 million to $0.14 million as shown in Table 6.2.

3. Short-term risks would be increased slightly by implementation of bioventing, since minimal waste would be disturbed during well installation.

4. Bioventing will be retained for further detailed evaluation.

6.1.3 REMEDIAL ALTERNATIVES FOR SITE LIQUIDS

1. The following potential remedial alternatives were developed for liquids located within and outside the reservoir boundary. The alternatives for the liquids are identified with the letters "LL." These alternatives are discussed in the following sections and are summarized in Table 6.3.

6.1.3.1 Remedial Alternative LL-1: No Further Action

1. As indicated previously, the No Further Action GRA implies that further remedial actions would not be taken. The No Further Action GRA has been included in this section for comparison purposes.

2. The No Further Action GRA would not be effective in reducing the TMV of COCs. It would not be effective in mitigating the risk of indirect exposure to COCs in onsite liquids.

3. The No Further Action GRA is retained to provide a basis for comparison of other alternatives. Costs for the No Further Action GRA are zero as no actions would be taken.

6.1.3.2 Remedial Alternative LL-2: Institutional Controls

1. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use

restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:

- Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
    - Signage.
    - Monitoring of access to affected areas or properties.
- Local governmental zoning and land use controls. Examples of these types of controls could include:
    - Zoning restricts land use to commercial/industrial land use.
    - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
    - Requiring the landowner to obtain approval for building or Site modifications from EPA, the DTSC, and Site custodian.
- Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
    - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.
    - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.

- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:
   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - CHSC Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - CCC Sections 1457-1471, with specific reference to restrictive environmental covenants.

   The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

3. The institutional controls GRA may be effective in preventing exposure to some COCs. Institutional controls can also prevent direct exposure of onsite workers to Site liquids. Institutional controls would not reduce the TMV of COCs. Institutional controls could not prevent vertical or lateral migration of Site liquids or reduce long-term risks except by controlling exposure pathways. Short-term risk would be decreased by institutional controls.

4. Estimated costs for institutional controls are highly dependent on costs to obtain agreements with the property owners. Estimated costs for the institutional controls Alternative LL-2 range from $0.11 million to $0.22 million as shown in Table 6.3.

5. Remedial Alternative LL-2 institutional controls is retained for detailed analysis.

6.1.3.3 <u>Remedial Alternative LL-3: Collection of Site Liquids</u>

1. Site liquids collection could include multiple LCPs (e.g., reservoir recovery wells) placed in the reservoir to monitor conditions. Recovery wells are the most frequently used method of liquids collection. Wells are screened for a distance of 1 or 2 feet above the top of the liner, and submersible pumps or bailers are used to extract the liquids that collect in them. TM No. 13 demonstrated the feasibility of removing reservoir liquids from recovery wells at the Site.

2. This technology may include the use of existing reservoir wells or installation of a separate monitoring well network. Various treatment processes could be used to manage the extracted liquids. For purposes of this SFS, liquids treatment will focus on the process demonstrated as part of TM No. 13. TM No. 13 demonstrated that liquids could be treated using an oil and water separator. The recovered oil was collected for recycling or disposal. The aqueous phase collected can be treated using carbon adsorption and discharged to an industrial sewer.

3. Remedial Alternative LL-3 provides long-term protection by removing reservoir liquids as shown in TM No. 13 Treatability Study. However, monitoring is required to determine the permanence of this alternative. Short-term risks are increased slightly since contaminated liquids are brought to the surface, treated and stored prior to discharge.

4. Estimated costs for Remedial Alternative LL-3 range from \$0.05 million to \$ 0.10 million, as shown in Table 6.3.

5. Remedial Alternative LL-3 collection of site liquids using recovery wells is retained for detailed analysis of liquids recovery within the reservoir.

6.1.3.4 <u>Remedial Alternative LL-4: Containment</u>

1. Site liquids containment would be similar to the containment technologies listed for the buried waste. Alternative technologies include: RCRA or RCRA-equivalent cap, asphalt, concrete, and monofill caps. Refer to Section 5.1.3 for a complete description of these technologies.

6.1.3.4.1 Remedial Alternative LL-4A: RCRA/RCRA-Equivalent Capping

1. Containment is the process used to control movement of soil and particulates, reduce surface water infiltration and prevent direct contact with Site liquids. In addition, capping deters soil erosion and can control air emissions and odors. A reduction in surface water infiltration minimizes the potential for leaching of contaminants to ground water and decreases the potential for subsurface liquids migration. Section 6.1.1.3.1 provides a description of the RCRA/RCRA-equivalent cap technology.

2. RCRA and RCRA-equivalent capping provides adequate effectiveness and permanence by preventing exposure to Site liquids, while long-term O&M activities are properly carried out.

Hazardous waste caps have been shown to be highly effective and easily maintained at numerous sites. Short-term risks would be minimal, since Site liquids would not be encountered during cap installation.

3. Estimated costs for Alternative LL-4A range from \$0.46 million to \$0.99 million for the reservoir area as shown in Table 6.3. Estimated costs for other areas with Site liquids have not been estimated.

4. Alternative LL-4A is retained for detailed analysis for liquids within and outside the reservoir.

6.1.3.4.2 Remedial Alternative LL-4B: Concrete or Asphalt Capping

1. A concrete or asphalt cap could also be used to cap the Site. This engineered cap may be suitable for parking, storage or building foundations. It could also be designed to include a gas barrier or collection layer. Section 6.1.1.3.2 provides a description of the asphalt and concrete capping technology.

2. Asphalt or concrete capping provides adequate effectiveness and permanence by preventing further surface water infiltration and reducing the potential exposure to Site liquids, while long-term O&M activities are properly carried out. Capping does not assure that Site liquids cannot migrate to ground water.

3. Short-term risks would be minimized, since Site liquids would not be encountered during cap installation.

4. Estimated costs for Remedial Alternative LL-4B range from \$0.43 million to \$0.92 million for the reservoir area, and \$0.41 million to \$0.89 million for Area 2 outside of the reservoir as shown in Table 6.3.

5. Remedial Alternative LL-4B: Asphalt or Concrete Capping was retained for detailed analysis of liquids within and outside the reservoir.

6.1.3.4.3 Remedial Alternative LL-4C: Monofill Capping

1. A monofill cap is an engineered cap placed over the waste areas to reduce surface water infiltration. The monofill cap is designed to prevent access to the waste by adjusting the

thickness of the cap. Surface water infiltration can be significantly reduced or eliminated, especially in an arid climate such as southern California. Section 6.1.1.3.3 provides a description of the monofill capping technology.

2. Monofill capping would provide adequate effectiveness and permanence by minimizing surface water infiltration and by reducing potential exposure to Site liquids, while long-term O&M activities are properly carried out. Short-term risks would be minimized, since Site liquids would not be encountered during cap installation.

3. Estimated costs for Remedial Alternative LL-4C range from $0.34 million to $0.73 million for the reservoir area, and $0.33 million to $0.70 million for Area 2 outside of the reservoir as shown in Table 6.3.

4. Remedial Alternative LL-4C: Monofill Capping is retained for detailed analysis of liquids within and outside the reservoir.

6.1.4 REMEDIAL ALTERNATIVES FOR GROUND WATER

1. The GRAs considered for the Site ground water are no further action, institution controls, monitoring and extraction and treatment. These alternatives are described in the following sections and summarized in Table 6.4. These alternatives for ground water remediation are labeled with the letters "GW."

6.1.4.1 Remedial Alternative GW-1: No Further Action

1. Remedial alternative GW-1 is the No Further Action GRA. Although not considered a remedial technology under the NCP, No Further Action implies that further remedial actions would not be taken. The No Further Action GRA has been included for comparison purposes only.

2. The No Further Action GRA would be effective in addressing ground water contaminants, since the apparent source of the contaminants is offsite and not related to the Site. It would not reduce the TMV of COCs. This alternative is implementable because it would have a substantially low cost and would be considered cost-effective. Monitoring the Site conditions would be required.

3. The estimated cost of the No Further Action GRA ranges from \$0.44 million to \$0.94 million as shown in Table 6.4.

4. The No Further Action GRA is retained to provide a basis for comparison of other alternatives.

6.1.4.2 Remedial Alternative GW-2: Institutional Controls

1. The State Water Code gives the Water Resource Control Board the authority to impose institutional controls. Institutional control details are not listed in the Water Code. The Water Resource Control Board reserves the right to interpret the Water Code to implement institutional controls that would protect the general public from contaminated ground water.

2. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:
   - Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
     - Signage.
     - Monitoring of access to affected areas or properties.
   - Local governmental zoning and land use controls. Examples of these types of controls could include:
     - Zoning restricts land use to commercial/industrial land use.
     - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
     - Requiring the landowner to obtain approval for building or Site modifications from EPA, the DTSC, and Site custodian.
   - Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
     - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and

analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.

  - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.

- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

3. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:

   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - CHSC Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - CCC Sections 1457-1471, with specific reference to restrictive environmental covenants.

   The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

4. Institutional controls may be effective in preventing short-term and long-term exposure to some COCs, by preventing direct exposure to ground water by the general public. Institutional controls will not reduce the TMV of COCs. The long-term effectiveness and performance of institutional controls is dependent on enforcement. Implementability of institutional controls must be coordinated with local governments, the Water Resource Control Board and with the actual landowners.

5. Estimated costs for the institutional controls alternative for ground water range from $0.11 million to $0.22 million, as indicated in Table 6.4.

6. The institutional control alternative is retained for detailed analysis because it provides a mechanism to control current and future ground water activities at the Site.

6.1.4.3 <u>Remedial Alternative GW-3: Ground Water Monitoring</u>

1. Remedial Alternative GW-3 is ground water monitoring. Ground water monitoring would consist of continuing the current ground water monitoring program at the Site.

2. Since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, implementation of ground water monitoring would provide improved protection of human health and the environment, long-term effectiveness and permanence in that it would provide an early warning should COCs begin migrating to the ground water. The implementability of ground water monitoring is demonstrated by the fact that the existing program has been in operation for a number of years. The estimated costs of this alternative range from $0.44 million to $0.94 million as shown in Table 6.4.

3. The ground water monitoring alternative is retained for detailed analysis because it provides a mechanism for monitoring the Site conditions.

6.1.4.4 <u>Remedial Alternative GW-4: Extraction and Treatment</u>

1. Remedial Alternative GW-4 is extraction and treatment. The extraction and treatment of ground water at the Site would consist of several ground water extraction wells located in the portion of the Site west of the reservoir. The wells would be placed within the interior of the Site to create an inward gradient and capture the contaminated ground water before it leaves the Site. The extracted ground water would be treated and then disposed by injection wells along the west perimeter of the Site to create a ground water barrier on the downgradient side of the Site.

2. This remedial alternative may be effective in preventing the migration of COCs in ground water onto the Site from offsite sources, and by reducing COCs in water leaving the Site. Future infiltration of rainwater will affect the total volume of ground water at the Site. The implementability of this treatment alternative will vary depending on the cooperation of the

owners of adjacent businesses. The estimated costs of this remediation alternative are considered high ranging from $1.97 million to $4.23 million, as shown in Table 6.4.

3. Long-term effectiveness of this alternative may be marginal since the source of the COCs in ground water appears to be offsite. If the source is offsite, the actual effectiveness of the approach would be marginal. Short-term risk would be increased minimally since contaminated ground water would be brought to the surface for treatment.

4. The ground water treatment alternative is retained for detailed analysis because it provides a mechanism to control future ground water conditions by controlling the inflow COCs onto and off of the Site.

6.1.5 REMEDIAL ALTERNATIVES FOR INDOOR AIR

1. The following potential remedial alternatives were developed for indoor air at the Site. The alternatives for indoor air are identified with the letter "ID." These remedial alternatives are described in the following sections and summarized in Table 6.5.

6.1.5.1 Remedial Alternative ID-1: No Further Action

1. Although not considered a remedial technology under the NCP, No Further Action implies that no further Remedial Actions would be taken. The No Further Action GRA has been included for comparison purposes.

2. The No Further Action GRA would not be effective in preventing future direct exposure to COCs in indoor air. It would not reduce the TMV of COCs. It would not be effective in mitigating the risk of indirect exposure to COCs, although current indoor air monitoring results have not shown infiltration of soil gas into businesses on the Site.

3. The estimated costs for the No Further Action GRA are zero, as shown in Table 6.5.

4. The No Further Action GRA is retained for further detailed evaluation.

6.1.5.2 Remedial Alternative ID-2: Institutional Controls

1. Institutional controls are nonengineering, legal measures that prevent off limit exposure to hazardous substances and pollutants or contaminants by restricting land and/or water use

restrictions placed on the Site properties through various mechanisms, such as the implementation of restrictive environmental easements, covenants and servitudes designed to reduce or eliminate potential exposures, governmental land use or zoning controls, and physical restrictions on access. The restrictive provisions for the Site could consist of the following types of institutional controls, as described in Table 5.10:

- Physical restrictions on access to all or portions of the Site, through signage or other methods to prevent trespassing. Examples of these types of controls could include:
  - Signage.
  - Monitoring of access to affected areas or properties.
- Local governmental zoning and land use controls. Examples of these types of controls could include:
  - Zoning restricts land use to commercial/industrial land use.
  - Zoning requires construction of any type to comply with City of Santa Fe Springs regulations and zoning requirements, especially those pertaining to methane gas protection and building appearance (landscaping, etc.).
  - Requiring the landowner to obtain approval for building or Site modifications from EPA, the DTSC, and Site custodian.
- Restrictive environmental easements, covenants and servitudes to limit land use (i.e., prevent excavation or digging, control future soil management), and prohibit future residential use. These are legal instruments placed in the chain-of-title for the subject real property interest from the landowner to another property or person. Examples of these types of controls could include:
  - New construction must have the approval of the EPA, DTSC and Site custodian and should be supported by subsurface explorations and analytical laboratory data to characterize the construction area for the possible existence of buried waste. The Site custodian would be authorized to manage the Site and monitor Site activities. The Site custodian would report to EPA and DTSC. If contaminants are discovered, they must be remediated or buildings and structures must be appropriately designed to protect occupants, and appropriate worker and public health and safety precautions (i.e., dust control, safety plans, worker protection, etc.) must be taken prior to approval of and during construction. These efforts, along with Site characterization, including subsurface explorations and the collection of analytical data to characterize the construction area for the possible existence of buried waste, must have the approval of EPA, DTSC and the Site custodian.
  - Boreholes, foundation piles or other subsurface penetrations into the reservoir or any other area of the Site which could create conduits allowing wastes to migrate to ground water may not be made without the approval of the EPA, DTSC and Site custodian.

- Restrictions on the use of ground water for consumption or other uses:
  - Ground water supply or monitoring wells shall not be constructed.
  - Prohibit use of onsite ground water for drinking, industrial uses or landscaping purposes.

2. The restrictive environmental covenants, easements and servitudes described above may be obtained under various mechanisms including the following:

   - The United States' authority to acquire interests in property under CERCLA Section 104(j).
   - CHSC Sections 25220-25241, providing authority to obtain easements at hazardous waste sites, and Sections 25202.5 and 25355.5-25355.8 providing for acquisition of easements from landowners through enforceable agreements or by mandatory imposition under certain circumstances.
   - CCC Sections 1457-1471, with specific reference to restrictive environmental covenants.

   The restrictions could be enforced independently by EPA and DTSC as the grantees or the third party beneficiaries to the restrictive easements.

3. The institutional controls GRA may be effective in preventing exposure to soil gas in buildings on the Site. Institutional controls will not reduce the TMV of the COCs. Institutional controls will not prevent migration of soil gases. Short-term risks would be decreased by institutional controls by reducing the potential exposures in businesses on the Site. Long-term effectiveness and performance of institutional controls is dependent on the enforcement of the institutional controls and deed restrictions. By controlling Site activities, the future risks are reduced.

4. Estimated costs for Remedial Alternate ID-2 range from $0.11 million to $0.22 million, as shown in Table 6.5.

5. Remedial Alternative ID-2: Institutional controls is retained for detailed analysis.

6.1.5.3 <u>Remedial Alternative ID-3: Containment</u>

1. As discussed in Chapter 5.0, containment measures or process options would prevent soil gas from entering the onsite buildings or prevent soil gas from accumulating in indoor air. These measures are divided into the following types of options:

   - Containment:
     - Vertical soil gas barriers.
     - Soil gas collection wells.

- Building Modifications:
  - Floor sealing.
  - Floor venting.
  - Ventilation changes.

Each of these is discussed in the following sections.

6.1.5.3.1 Remedial Alternative ID-3A: Containment

1. The containment alternatives consist of the use of barriers or collection points to prevent the soil gas from entering buildings. The collection alternatives are generally passive, although they may be operated initially under active conditions. These alternatives include:
   - Vertical soil gas barriers (e.g., trenches, slurry walls).
   - Vertical collection wells.

2. The containment GRA would be effective in reducing the potential exposure to soil gas. Collection and treatment or venting of the subsurface gases would reduce the TMV of the soil gas. Short-term risks would be increased during excavation of waste material to construct the barriers or collection points. Long-term risks would be reduced by preventing the migration of soil gas under buildings.

3. Estimated costs for Remedial Alternative ID-3A range from $0.12 million to $2.20 million, as shown in Table 6.5.

4. Remedial Alternative ID-3A: Containment is retained for detailed analysis.

6.1.5.3.2 Remedial Alternative ID-3B: Building Modifications

1. The building modifications are designed to prevent exposure of onsite workers to the accumulation of soil gas within buildings on the Site. This can be accomplished using one or more of the following technologies:
   - Improved building ventilation.
   - Positive building pressure.
   - Under foundation vents.
   - Floor sealing.
   - Building monitoring and controls.

2. The use of building modifications would be effective in preventing exposure of workers on the Site by interrupting the pathway of soil gas into the building. Short-term risks would be minimal since waste will be disturbed during implementation. Long-term risks would be reduced by preventing exposure of workers on the Site.

3. Estimated costs for Remedial Alternative ID-3B range from $0.13 million to $0.26 million, as shown in Table 6.5.

4. Remedial Alternative ID-3B is retained for detailed analysis.

6.1.5.4 Remedial Alternative ID-4: Treatment

1. Treatment remedial alternatives are designed to reduce the TMV of the contaminants in the soil and to meet RAOs. The treatment technologies retained for further study are SVE and bioventing.

6.1.5.4.1 Remedial Alternative ID-4A: SVE

1. SVE is an in-situ unsaturated zone soil remediation technology in which a vacuum is applied to the soil to induce a flow of air and remove VOC and SVOCs from the soil. Offgas from the system may be treated to remove or destroy the contaminants depending on local and state air emission requirements. Vertical extraction wells are used at depths of 5 feet or greater and have been successfully applied as deep as 30 feet at the Site. Horizontal extraction vents (trenches or horizontal borings) can also be used to accommodate unusual contaminant zone geometry, limited drill rig access or other site-specific factors.

2. This technology would be applied with the goal of trying to attain risk-based Remedial Action levels for soil and subsurface sources. It would achieve a reduction in TMV of the contaminants at the Site. A treatability study (TM No. 9A - Soil Vapor Extraction Testing) has been performed and has shown SVE to be effective. SVE can be modified with thermal enhancement to increase the mobility of VOCs and SVOCs.

3. Short-term risks are slightly increased during implementation, since minimal waste will be disturbed during well or trench installation. Long-term effectiveness and permanence can be achieved outside waste zones. However, in waste zones soil gas levels are likely to return to original levels after the treatment system is turned off.

4. Estimated costs for Remedial Alternative ID-4A range from $0.11 million to $0.23 million, as shown in Table 6.5.

5. Remedial Alternative ID-4A SVE is retained for detailed analysis.

6.1.5.4.2 Remedial Alternative ID-4B: Bioventing

1. Bioventing is an in-situ process which increases the oxygen content in the subsurface soils to enhance biodegradation of hydrocarbons. Bioventing can be accomplished using an active process, similar to SVE, or in a passive mode using atmospheric pressure to increase the oxygen levels in soils.

2. This technology may attain risk-based Remedial Action levels for soil and subsurface sources. It may also achieve a reduction in TMV of the contaminants at the Site.

3. Bioventing has not been tested at the Site, however it is expected to be effective in the long term shifting the subsurface soils to aerobic conditions to prevent methane generation. Short-term risks would be slightly increased since minimal waste would be disturbed during installation.

4. Estimated costs for Remedial Alternative ID-4B range from $0.07 million to $0.14 million, as shown in Table 6.5.

5. Remedial Alternative ID-4B is retained for further detailed analysis.

6.2 ASSEMBLY OF SITE-WIDE REMEDIAL ALTERNATIVES

1. As indicated in Section 6.1, the remedial options are assembled into site-wide remedial alternatives, as described in the following sections.

6.2.1 ALTERNATIVE 1 - NO FURTHER ACTION

1. This alternative is required by the NCP to provide a basis for comparison of other alternatives. Under this alternative, further actions would not be taken to restrict access to the Site or to reduce the potential for exposure.

2. The No Further Action alternative would only include continuation of the current Site ground water monitoring program.

3. Alternative 1 is evaluated to be ineffective in the short term and long term for protecting human health and the environment. It will not result in reduction in TMV of the wastes. It is not evaluated to be technically and administratively implementable. The cost of Alternative 1 is estimated to be on the low end of the range of alternatives considered. Alternative 1 is retained for detailed analysis as required by the NCP.

6.2.2 ALTERNATIVE 2 - RCRA-EQUIVALENT CAP (OVER RESERVOIR) AND MONOFILL (SOIL) CAP OVER PORTIONS OF AREAS 1, 2, 4, 5, 6, 7 AND 8; RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent cap to provide containment for the reservoir area. The monofill cap would cover areas underlain by waste materials in Areas 1, 2, 4, 5, 6, 7 and 8. A total of approximately 546,000 square feet (ft^2) of area would be covered by the monofill cap.

2. The typical multimedia RCRA or RCRA-equivalent cap would consist of an engineered system of geosynthetic and earthen materials designed to prevent direct exposure to buried waste and minimize surface water infiltration. The primary difference between a RCRA cap versus a RCRA-equivalent cap is the thickness of the layers (e.g., clay layer), which typically are much thicker in the RCRA cap. The proposed RCRA-equivalent cap would cover an estimated 306,000 ft^2 area. The cap could consist of the following, from top to bottom, or an engineering equivalent thereof:
   - Soil layer.
   - Drainage layer.
   - Geomembrane layer (impermeable barrier to prevent exposure and surface water infiltration).
   - A gas collection layer is often included in RCRA or RCRA-equivalent caps.
   - Foundation layer of recompacted natural soils.

3. The waste materials at the Site are presently covered by approximately 5 to 10 feet of fill material. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} centimeters per second (cm/sec) (TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 to 6 feet of the fill soils is typically free of significant quantities of construction debris. The existing fill material

satisfies the performance requirements for a monofill cap (i.e., it has low permeability and will minimize infiltration of surface water; promote drainage and [with suitable vegetation] minimize erosion; accommodate settling and subsidence; and function with a minimum of maintenance). However, it will be checked for compliance with the requirements during implementation of the alternative as described in Section 6.1.1.3.3 and areas of noncompliance will be corrected. Approximately 70,000 ft^2 of the area discussed above is also covered by asphalt and/or concrete pavement, which enhances the containment of the buried waste. The surface of the unpaved areas would be regraded, where necessary, to improve drainage, vegetated with drought-resistant native plants to provide protection against erosion and equipped with an irrigation system to support the vegetation. The irrigation system would be carefully controlled to prevent overwatering which could lead to increases in the amount of liquids in contact with the waste. In areas that are currently paved, the pavement will be repaired, as necessary, to enhance containment of the buried waste.

4. The LCPs (e.g., recovery wells) will be installed within the reservoir boundary to monitor for the existence of "free-liquids" within the buried waste. "Free liquids" collecting at these points will be purged and removed from the Site for treatment and disposal at an EPA-approved disposal facility based on a removal criteria. Locations for the LCPs will be established during the remedial design.

5. Some of the existing buildings in Areas 2, 5 and 8 (e.g., 9843 Greenleaf, 12637B, 12801 and 12747 Los Nietos Road) are suspected of being constructed over the buried waste materials. These buildings will be provided with engineering controls to prevent the potential build-up of soil gases in their interiors. The engineering controls may consist of sealing penetrations in the floor slabs, installation of passive or active gas venting systems below floor slabs, installation of positive pressure heating, ventilation and air conditioning improvements or some combination of these controls.

6. New developments in areas underlain by waste materials will be performed in accordance with deed restrictions and will include institutional controls (e.g., monitoring and soil gas barrier systems) to assure protection of human health and the environment. If built over waste, the new building foundations would be engineered to act as part of the cap.

7. Ground water monitoring and institutional controls will be conducted to assure current conditions are maintained.

8. Alternative 2 is evaluated to be effective in the short term and long term for protecting human health and the environment. Although it will result in little reduction in toxicity and volume, it will reduce mobility of the wastes. It is evaluated to be technically and administratively implementable. The cost of Alternative 2 is estimated to be on the lower end of the range of alternatives considered. Alternative 2 is retained for detailed analysis.

6.2.3 ALTERNATIVE 3 - RCRA-EQUIVALENT ASPHALT CAP OVER RESERVOIR AND AREA 2; ASPHALT CAP OVER SELECTED PORTIONS OF AREAS 1, 4, 5, 6, 7 AND 8; RESERVOIR LCPs; SOIL VAPOR EXTRACTION IN NONCOMPLIANCE AREAS (5, 7 AND 8); SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent asphalt a cap over the reservoir and Area 2 to provide containment for the buried waste and as a continuous physical barrier in Area 2. A total of approximately 739,200 ft^2 of area would be covered by asphalt pavement. In the reservoir area, the asphalt pavement would be underlain by a geomembrane barrier layer and a geocomposite gas collection layer. This cap would be equivalent in performance to a RCRA cap.

2. An asphalt cap would also cover areas underlain by buried waste in Areas 1, 4, 5, 6, 7 and 8. Approximately 187,000 ft^2 of area would be asphalt covered. The ground surface would be regraded where necessary to improve drainage. In areas that are currently paved, the pavement, including foundations and slabs, would be repaired, as necessary, to enhance containment of the buried waste.

3. A gas collection system would be installed beneath the asphalt cap over the reservoir. This system would consist of a geocomposite collection layer and a network of collector pipes installed immediately beneath the geomembrane barrier layer. For the first year following closure of the Site, the gas collection system would be operated as an active system by using a blower to create a negative pressure on the system. Following the first year of operation, it is anticipated that the gas volumes would be low enough that the blower could be turned off and the system run as a passive gas collection system. The extracted gases would be treated by an appropriate technology.

4. Similar to Alternative 2, this alternative will also include reservoir LCPs, passive bioventing wells along portions of the perimeter of the buried waste, engineering controls in existing buildings which are underlain by waste, institutional controls for new developments in areas

underlain by waste materials and soil gas engineering controls. If built over waste, the new building foundations would be engineered to act as part of the cap. In addition an SVE system will be incorporated in noncompliance areas (5, 7 and 8).

5. Ground water monitoring and institutional controls are also included to assure maintenance of current conditions.

6. Alternative 3 is evaluated to be effective in the short term and long term for protecting human health and the environment. Although it will result in little reduction in toxicity and volume, it will reduce mobility of the wastes. It is evaluated to be technically and administratively implementable. The cost of Alternative 3 is estimated to be on the mid-range of alternatives considered. Alternative 3 is retained for detailed analysis.

6.2.4 ALTERNATIVE 4 - RCRA-EQUIVALENT CAP OVER RESERVOIR; MONOFILL CAP OVER SELECTED PORTIONS OF AREAS 2, 4, 5 AND 7; EXCAVATION/CONSOLIDATION OF BURIED WASTE FROM AREAS 1, 6 AND 8; RESERVOIR LCPs; SVE IN AREAS OF NONCOMPLIANCE; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent cap over the reservoir to provide containment for the buried waste and serve as a continuous physical barrier. A total of approximately 306,000 ft^2 of area would be covered by the RCRA-equivalent cap. This cap would consist of, from the top down:
   - A 2-foot-thick vegetative layer.
   - A single-sided geocomposite drainage layer.
   - A 60-mil-thick HDPE geomembrane barrier layer.
   - A single-sided geocomposite gas collection layer.
   - A foundation layer (approximately 2 feet thick).

2. Outside of the reservoir (Areas 2, 4, 5 and 7), a monofill cap will be used to provide containment of the wastes and serve as a continuous physical barrier. A total of approximately 384,000 ft^2 of area would be covered by a monofill cap. The waste materials underlying Areas 2, 4, 5 and 7 at the Site are presently covered by approximately 5 to 10 feet of fill material. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} cm/sec (TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 to 6 feet of the fill soil is typically free of significant quantities of construction debris. The existing fill material satisfies the performance requirements for a monofill cap (i.e., it has low permeability and will minimize infiltration of

surface water; promote drainage and [with suitable vegetation] minimize erosion; accommodate settling and subsidence; and function with a minimum of maintenance). Approximately 70,000 ft^2 of the above area is also covered by asphalt and/or concrete pavement, which enhances the containment of the buried waste. The surface of the unpaved areas would be regraded where necessary to improve drainage, vegetated with drought-resistant native plants to provide protection against erosion and equipped with an irrigation system to support the vegetation. In areas that are currently paved, including slabs and foundations, will be repaired, as necessary, to enhance containment of the buried waste.

3. Prior to construction of the RCRA-equivalent cap over the reservoir, the waste material in Areas 1, 6 and 8 would be excavated and consolidated within the reservoir boundary. The resulting excavations in Areas 1, 6 and 8 would be backfilled with clean, compacted fill material. This may eliminate the need for most institutional controls at these three areas.

4. Similar to Alternative 3, the gas collection system beneath the RCRA-equivalent cap would be operated as an active system for the first year and as a passive system thereafter. Collected gases would be treated by an appropriate technology.

5. This alternative would also include reservoir LCPs, passive bioventing wells along the perimeter of the buried waste, soil gas engineering controls, engineering controls in existing buildings which are underlain by waste and institutional controls for new developments in areas underlain by waste material.

6. Ground water monitoring and institutional controls will be used to assure maintenance of existing conditions.

7. Alternative 4 is evaluated to be effective in the short term and long term for protecting human health and the environment. Although it will result in little reduction in toxicity and volume, it will reduce mobility of the wastes. It is evaluated to be technically and administratively implementable. The cost of Alternative 4 is estimated to be on the mid-range of alternatives considered. Alternative 4 is retained for detailed analysis.

6.2.5 ALTERNATIVE 5 - RCRA-EQUIVALENT CAP OVER RESERVOIR; MONOFILL CAP OVER SELECTED PORTIONS OF AREAS 1, 2, 4, 6, 7 AND 8; EXCAVATION/CONSOLIDATION OF WASTE FROM ADJACENT TO BUILDINGS (AREAS 5, 8 AND WEST CORNER OF AREA 2); RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. Similar to Alternative 4, this alternative incorporates a RCRA-equivalent cap over the reservoir to provide containment for the buried waste and serve as a continuous physical barrier. The area covered by a RCRA-equivalent cap and the configuration of the cap are the same as discussed in Alternative 4.

2. Outside of the reservoir, Areas 1, 2, 4, 6, 7 and 8, a monofill cap would be used to provide containment of the buried waste and serve as a continuous physical barrier. A total of approximately 464,300 ft^2 of area would be covered by a monofill cap. The waste material underlying Areas 1, 2, 4, 6, 7 and 8 at the Site is presently covered by approximately 5 to 10 feet of fill material. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} cm/sec (TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 to 6 feet of the fill soil is typically free of significant quantities of construction debris. The existing fill material satisfies the performance requirements for a monofill cap (i.e., it has low permeability and will minimize infiltration of surface water; promote drainage and [with suitable vegetation] minimize erosion; accommodate settling and subsidence; and function with a minimum of maintenance). Approximately 31,500 ft^2 of the area mentioned above is also covered by asphalt and/or concrete pavement, which enhances the containment of the buried waste. The surface of the unpaved areas would be regraded where necessary to improve drainage, vegetated with drought-resistant native plants to provide protection against erosion and equipped with an irrigation system to support the vegetation. In areas that are currently paved, including foundations and slabs, would be repaired, as necessary, to enhance containment of the buried waste.

3. Prior to construction of the RCRA-equivalent cap over the reservoir, the waste material adjacent to buildings in Areas 5, 8 and the west corner of Area 2 would be excavated and consolidated within the reservoir boundary. The resulting excavations in would be backfilled with clean, compacted fill material.

4. Similar to Alternative 3, the gas collection system beneath the RCRA-equivalent cap would be operated as an active system for the first year and as a passive system thereafter. Collected gases would be treated by an appropriate technology.

5. This alternative would also include reservoir LCPs, passive bioventing wells along the perimeter of the buried waste, soil gas engineering controls and institutional controls for new developments in areas underlain by waste material.

6. Alternative 5 is evaluated to be effective in the short term and long term for protecting human health and the environment. However, in the short term it may result in greater human health exposure due to excavation of wastes from adjacent to existing buildings. Although it will result in little reduction in toxicity and volume, it will reduce mobility of the wastes. It is evaluated to be technically and administratively implementable, although there may be some administrative difficulties associated with the waste excavations. The cost of Alternative 5 is estimated to be on the high end of alternatives considered. Alternative 5 is retained for detailed analysis.

6.2.6 ALTERNATIVE 6 - RCRA-EQUIVALENT CAP OVER AREA 2 INCLUDING THE RESERVOIR; EXCAVATION/CONSOLIDATION OF WASTES FROM AREAS 1, 4, 5, 6, 7, 8 AND WEST CORNER OF AREA 2; RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent cap over Area 2, including the reservoir, to provide containment for the buried waste and serve as a continuous physical barrier. A total of approximately 594,000 ft^2 of area would be covered by the RCRA-equivalent cap. This cap would consist of, from the top down:
   - A 2-foot-thick vegetative layer.
   - A single-sided geocomposite drainage layer.
   - A 60-mil-thick HDPE geomembrane barrier layer.
   - A single-sided geocomposite gas collection layer.
   - A foundation layer (approximately 2 feet thick).

2. Outside of Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2), the waste would be excavated and consolidated on top of the reservoir and in Area 2.

3. Similar to Alternative 3, the gas collection system beneath the RCRA-equivalent cap would be operated as an active system for the first year and as a passive system thereafter. Collected gases would be treated by an appropriate technology.

4. This alternative would also include reservoir LCPs, passive bioventing wells along the perimeter of the buried waste, soil gas engineering controls and institutional controls for new developments in areas underlain by waste material. Except for Area 2, most of the institutional controls would not be necessary.

5. Alternative 6 is evaluated to be effective in the short term and long term for protecting human health and the environment. However, in the short term it may result in greater human health exposure due to excavation of wastes. Although it will result in little reduction in toxicity and volume, it will reduce mobility of the wastes. It is evaluated to be technically and administratively implementable, although there may be some administrative difficulties associated with the waste excavations. The cost of Alternative 6 is estimated to be on the high end of the range of alternatives considered. Alternative 6 is retained for detailed analysis.

6.2.7 ALTERNATIVE 7 - GROUND WATER MONITORING

1. This alternative is the continuation of the current Site ground water monitoring program.

2. Alternative 7 is evaluated to be effective in the short term and long term for protecting human health and the environment. It will not result in reduction in TMV of the wastes. It is technically and administratively implementable. The cost of Alternative 7 is estimated to be on the low end of the range of alternatives considered.

6.2.8 ALTERNATIVE 8 - GROUND WATER EXTRACTION AND TREATMENT

1. This alternative consists of extraction and treatment of the ground water beneath the Site and would use several ground water extraction wells located in the portion of the Site west of the reservoir. The extraction wells would be placed within the interior of the Site to create an inward gradient and capture the contaminated ground water before it leaves the Site. The extracted ground water would be treated and then disposed in injection wells located along the west perimeter of the Site to create a ground water barrier on the downgradient side of the Site.

2. Alternative 8 is evaluated to be effective in the short term and long term for protecting human health and environment. Future infiltration of rainwater will affect the total volume of ground water at the Site. The implementability of this treatment alternative will vary depending on the cooperation of the owners of adjacent business. The cost of Alternative 8 is estimated to be on the high end of the range of ground water alternatives considered.

TABLE 6.1

REMEDIAL ALTERNATIVES FOR SOILS
WASTE DISPOSAL, INC. SUPERFUND SITE

ALTERNATIVE	DESCRIPTION	EFFECTIVENESS SHORT-TERM	EFFECTIVENESS LONG-TERM	IMPLEMENTABILITY	ESTIMATED COST RANGE (in the millions)	RETAINED FOR FURTHER REMEDIAL ANALYSIS
S-1	No Further Action	None.	None.	Fully Implementable.	0	Yes - for comparison purposes
S-2	Institutional Control Restrictive Easements	Reduce short-term risks by controlling exposure pathways.	Reduce long-term risks by controlling exposure pathways. However effectiveness is dependent on the enforcement of controls.	Potentially implementable, however institution controls may be difficult to obtain.	0.11 - 0.22	Yes
S-3 CONTAINMENT						
S-3A	RCRA/RCRA-Equivalent Capping	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness is high if cap is properly maintained.	Implementable in the reservoir and Area 2. Implementation outside Area 2 may be difficult due to onsite businesses.	1.17 - 2.51	Yes
S-3B	Asphalt/Concrete Capping	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness is high if cap is properly maintained.	Implementable throughout the Site, and in areas near onsite businesses.	1.09 - 2.33	Yes
S-3C	Monofill Soil Cover	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness is high if cap is properly maintained.	Implementable in the reservoir and Area 2. Monofill cover may be used in portions of Areas 3, 4, 6 and 7.	0.86 - 1.84	Yes
S-4 EXCAVATION						
S-4A	Excavation Adjacent to Buildings in Areas 5, 8 and the west corner of Area 2.	Excavation will increase the short-term risks.	Long-term effectiveness is high, since waste is excavated and redisposal onsite under a cap or minimized offsite.	Implementation may be impacted by odor and VOC emission.	1.29 - 2.77	Yes
S-4B	Excavation Areas 1, 6 and 8	Excavation will increase the short-term risks.	Long-term effectiveness is high since waste is excavated and redisposal onsite under a cap or minimized offsite.	Implementation may be impacted by odor and VOC emission. Further, the presence of onsite businesses with waste under buildings may limit implementation, depending on the property owners.	1.45 - 3.11	Yes
S-4C	Excavation Areas 1, 4, 5, 6, 7, 8 and west corner of Area 2	Excavation will increase the short-term risks.	Long-term effectiveness is high since waste is excavated and redisposal onsite under a cap or minimized offsite.	Implementation may be impacted by odor and VOC emission. Further, the presence of onsite businesses with waste under buildings may limit implementation, depending on the property owners.	5.67 - 12.15	Yes

94-256/Rpts/SFS (7/24/00/jb)

TABLE 6.2

REMEDIAL ALTERNATIVES FOR SOIL GAS
WASTE DISPOSAL, INC. SUPERFUND SITE

ALTERNATIVE	DESCRIPTION	EFFECTIVENESS SHORT-TERM	EFFECTIVENESS LONG-TERM	IMPLEMENTABILITY	ESTIMATED COST RANGE (in the millions)	RETAINED FOR FURTHER REMEDIAL ANALYSIS
SG-1	No Further Action	None.	None.	Fully Implementable.	0	Yes - for comparison purposes
SG-2	Institutional Controls (Restrictive Easements)	Reduce short-term risks by controlling exposure pathways.	Reduce long-term risks by controlling exposure pathways. However effectiveness is dependent on the enforcement of controls.	Potentially implementable, however institution controls may be difficult to obtain.	0.11 - 0.22	Yes
SG-3	Vertical Soil Gas Barriers	Construction of slurry walls, FMLs, and trenches will increase short-term risks.	Long-term effectiveness is unknown given the Site conditions, but shows adequate long-term performance in similar usage.	Implementable, however this could be affected by unknown subsurface material.	3.80 - 4.97	No
SG-4	Horizontal Soil Gas Barriers	No significant increase in short-term risks, since minimal waste would be disturbed.	Reduce long-term risk by removing soil gas constituents for treatment and discharge.	Implementable with a variety of cap types.	0.08 - 0.17	Yes
SG-5	Soil Vapor Extraction (SVE)	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness in areas outside the buried waste.	Implementable based on TM No. 9 SVE Treatability Study data.	0.11 - 0.23	Yes
SG-6	Bioventing	No significant increase in short-term risks, since minimal waste would be disturbed.	Potential long-term effectiveness by reducing soil gas levels.	Implementable based on TM No. 9 SVE Treatability Study data.	0.07 - 0.14	Yes

94-256/Rpts/SFS (7/24/00/jb)

TABLE 6.3

REMEDIAL ALTERNATIVES FOR SITE LIQUIDS
WASTE DISPOSAL, INC. SUPERFUND SITE

ALTERNATIVE	DESCRIPTION	EFFECTIVENESS SHORT-TERM	EFFECTIVENESS LONG-TERM	IMPLEMENTABILITY	ESTIMATED COST RANGE (in the millions)	RETAINED FOR FURTHER REMEDIAL ANALYSIS
LL-1	No Further Action	None.	None.	Fully Implementable.	0	Yes - for comparison purposes
LL-2	Institutional Control (Restrictive Easements)	Reduce short-term risks by controlling exposure pathways.	Reduce long-term risks by controlling exposure pathways. However effectiveness is dependent on the enforcement of controls.	Potentially implementable, however institution controls may be difficult to obtain.	0.11 - 0.22	Yes
LL-3	Collection	Slight increase since contaminated liquids are brought to the surface.	Long-term effectiveness is high, since contaminated liquids would be removed.	Implementable based on TM No. 13.	0.05 - 0.10	Yes
LL-4 CONTAINMENT						
LL-4A	RCRA/RCRA-Equivalent Capping	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness is high if cap is properly maintained.	Implementable in the reservoir and Area 2. Implementation outside Area 2 may be difficult due to onsite businesses.	0.46 - 0.99	Yes
LL-4B	Asphalt/Concrete Capping	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness is high if cap is properly maintained.	Implementable throughout the Site, and in areas near onsite businesses.	0.43 - 0.92 (Reservoir) 0.41 - 0.89 (Area 2 not including Reservoir)	Yes
LL-4C	Monofill Soil Cover	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness is high if cap is properly maintained.	Implementable in the reservoir and Area 2. Monofill cover may be used in portions of Areas 3, 4, 6, and 7.	0.34 - 0.73 (Reservoir) 0.33 - 0.70 (Area 2 not including Reservoir)	Yes

94-256/Rpts/SFS (7/24/00/jb)

TABLE 6.4

REMEDIAL ALTERNATIVES FOR GROUND WATER
WASTE DISPOSAL, INC. SUPERFUND SITE

ALTERNATIVE	DESCRIPTION	EFFECTIVENESS SHORT-TERM	EFFECTIVENESS LONG-TERM	IMPLEMENTABILITY	ESTIMATED COST RANGE (in the millions)	RETAINED FOR FURTHER REMEDIAL ANALYSIS
GW-1	No Further Action	None.	None.	Fully Implementable.	0.44 - 0.94	Yes - for comparison purposes
GW-2	Institutional Controls (Restrictive Easements)	Reduce short-term risks by controlling exposure pathways.	Reduce long-term risk by controlling exposure pathways. However the effectiveness is dependent on the enforcement of the controls.	Potentially implementable, however institution controls may be difficult to obtain.	0.11 - 0.22	Yes
GW-3	Monitoring	Reduce short-term risks by assuming compliance with water quality standards.	Reduce long-term exposure by assuring compliance with water quality standards.	Fully implementable.	0.44 - 0.94	Yes
GW-4	Extraction and Treatment	No significant increase in short-term risks, since minimal waste would be disturbed.	Effective in reducing and controlling the migration COCs.	Implementation may be difficult due to onsite businesses.	1.97 - 4.23	Yes

94-256/Rpts/SFS (7/24/00/jb)

TABLE 6.5

REMEDIAL ALTERNATIVES FOR INDOOR AIR
WASTE DISPOSAL, INC. SUPERFUND SITE

ALTERNATIVE	DESCRIPTION	EFFECTIVENESS SHORT-TERM	EFFECTIVENESS LONG-TERM	IMPLEMENTABILITY	ESTIMATED COST RANGE (in the millions)	RETAINED FOR FURTHER REMEDIAL ANALYSIS
ID-1	No Further Action	None.	None.	Fully Implementable.	0	Yes - for comparison purposes
ID-2	Institutional Control (Restrictive Easements)	Reduce short-term risks by controlling exposure pathways.	Reduce long-term risks by controlling exposure pathways. However effectiveness is dependent on the enforcement of controls.	Potentially implementable, however institution controls may be difficult to obtain.	0.11 - 0.22	Yes
ID-3 CONTAINMENT						
ID-3A	Containment - Gas Barriers and collection wells	Short-term risks would be increased during excavation of waste material adjacent to buildings.	Long-term risks would be reduced by preventing migration of soil gas under buildings.	Implementable, however this could be affected by unknown subsurface material.	0.12 - 2.20	Yes
ID-3B	Building Modifications	No significant increase in short-term risks, since minimal waste would be disturbed.	Long-term risks would be reduced by preventing exposure of onsite waste.	Implementability highly depend on the cooperation of the onsite business owners.	0.13 - 0.26	Yes
ID-4 TREATMENT						
ID-4A	Soil Vapor Extraction (SVE)	Slight increase in short-term risks, since minimal waste would be disturbed.	Long-term effectiveness in areas outside the buried waste.	Implementable based on TM No. 9 SVE Treatability Study data.	0.11 - 0.23	Yes
ID-4B	Bioventing	Slight increase in short-term risks, since minimal waste would be disturbed.	Potential long-term effectiveness by reducing soil gas levels.	Implementable based on TM No. 9 SVE Treatability Study data.	0.07 - 0.14	Yes

94-256/Rpts/SFS (7/21/00/rm)

7.0 SUMMARY AND COMPARISON OF SITE-WIDE REMEDIAL ALTERNATIVES

7.1 OVERALL APPROACH

1. Individual remedial technologies were screened in Chapter 5.0 to optimize overall effectiveness and practicability. Remedial technologies that were retained after screening were then assembled into site-wide remedial alternatives in Chapter 6.0. These site-wide remedial alternatives were then screened in Chapter 6.0 to optimize overall effectiveness and practicability. The remedial alternatives that were retained for further consideration following this screening are analyzed in detail in this chapter.

2. It should be noted that there are a multitude of combinations of remedial technologies that can be created for addressing remediation of the Site. An effort has been made to show a range of site-wide options, their costs and to explain the choice of alternatives. These remedial alternative assemblies have been developed based on the Site conditions and the results of the screening presented in Chapter 6.0.

3. The remedial technologies, in any combination, would not be capable of completely remediating the Site without presenting unacceptable exposures to waste materials. The remedial alternative that would be capable of completely remediating the Site and allowing unrestricted future reuse of property, is that in which all buried waste materials are excavated and removed from the Site for disposal at a licensed facility, i.e., clean closure. This alternative was discussed in Chapter 5.0 and presents significant health risks to the community due to the difficulties in controlling VOC and odor emissions, and the high volume of trucks hauling waste from the Site over a period of years. In addition, the cost of this remedial alternative is excessive at over $150,000,000. Since other acceptable remedial alternatives exist for addressing the Site without these significant health risks, the excavation of all buried wastes was not given further consideration. These other alternatives include leaving some buried wastes at the Site. Therefore, institutional controls are included in each of the remedial alternatives developed. In addition, this chapter includes monitoring for each remedial alternative to document performance of the remedy that will be implemented.

7.2 EVALUATION CRITERIA

1. Each remedial alternative discussed in this chapter has been designed to address threats posed by buried waste, soil gas and liquids located within and outside the reservoir boundary. As

requested by EPA, ground water is addressed in separate alternatives. The site-wide remedial alternatives are analyzed in detail for nine criteria as defined in the NCP. The first seven criteria (Threshold and Primary Balancing Criteria) are addressed in this SFS. The last two criteria (Modifying Criteria) will be addressed by EPA in the ROD, once state and public comments are received on the SFS and proposed plan.

2. The detailed remedial alternative analysis is the method for assembling and evaluating technical and policy considerations to develop the rationale for selecting a remedy. The following paragraphs define and detail the nine NCP criteria.

7.2.1 OVERALL PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

1. This evaluation criterion is an assessment of whether each site-wide remedial alternative achieves and maintains adequate protection of human health and the environment. The overall appraisal of protection draws on the assessments conducted under other evaluation criteria, especially long-term effectiveness and permanence, short-term effectiveness and compliance with ARARs. Another consideration is the statutory preference for onsite remedial actions.

7.2.2 COMPLIANCE WITH ARARs

1. This evaluation criterion is used to determine whether an alternative would meet the federal, state and local ARARs that have been previously identified. ARARs will be identified for each remedial alternative and descriptions on how they are met will be given. When an ARAR is not met, the basis for justifying one of the six waivers allowed under CERCLA will be discussed. A discussion of the compliance of each alternative with chemical-, location- and action-specific ARARs is included.

7.2.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

1. Under this criterion, the results of a remedial alternative are evaluated in terms of the risk remaining at the Site after response objectives have been met. The primary focus of this evaluation is the extent and effectiveness of the actions or controls that may be required to manage the risk posed by treatment residuals or untreated wastes. Factors to be considered and addressed are magnitude of residual risk, adequacy of controls and reliability of controls. Magnitude of risk is the assessment of that remaining from untreated waste or treatment residuals after remediation. Adequacy and reliability of controls is the evaluation of those that

can be used to manage treatment residuals or untreated wastes that remain at the facility. The evaluation may include an assessment of containment systems and institutional controls to determine whether they are sufficient to assure that an exposure to human and environmental receptors is within protective levels.

7.2.4 REDUCTION OF TOXICITY, MOBILITY AND VOLUME (TMV) THROUGH TREATMENT

1. This evaluation criterion addresses the statutory preference for selecting remedial actions that use, as their principal element, technologies to permanently treat and significantly reduce the toxicity, mobility or volume of the hazardous substances. This preference is satisfied when treatment is used to reduce the principal threats at a site through destruction of toxic contaminants, reduction of the total mass of toxic contaminants, irreversible reduction of contaminant mobility or reduction of total volume of contaminated media. When evaluating this criterion, an assessment is made as to whether treatment is used to reduce principal threats, including the extent to which toxicity, mobility, or volume are reduced either separately or in combination with one another. Critical factors include the following:
    - Treatment processes employed by the remedy.
    - Amount of hazardous materials to be treated.
    - Degree of expected reduction in toxicity, mobility or volume measured as a percentage of reduction.
    - Degree to which the treatment would be irreversible.
    - Type and quantity of treatment residuals that would remain following treatment.
    - Whether the alternative would satisfy the statutory preference for treatment as a principal element.

2. CERCLA guidance indicates that although a statutory preference exists for treatment, capping is considered an acceptable alternative, since the exposure pathway is eliminated.

7.2.5 SHORT-TERM EFFECTIVENESS

1. This evaluation criterion addresses the effects of the alternative during the construction and implementation phase until RAOs are met. Alternatives are evaluated with respect to their effects on human health and the environment during implementation of the remedial action. The following factors need to be addressed for each alternative:
    - Protection of the community during remedial actions, including air quality impacts.
    - Protection of workers during remedial actions, including air quality impacts.
    - Environmental impact during remedial actions, including air quality impacts.
    - Amount of time to achieve remedial objectives.

7.2.6 IMPLEMENTABILITY

1. The implementability criterion addresses the technical and administrative feasibility of executing an alternative and the availability of various services and materials required during its implementation. Technical feasibility includes construction, operation, reliability of technology and the ease of undertaking additional remedial action and monitoring. Administrative feasibility refers to the activities needed to coordinate with other offices and agencies (local permits, for example). Availability of services and materials include availability of adequate off-facility treatment, storage capacity and disposal services, necessary equipment and specialists, services and materials, and prospective technologies.

7.2.7 COST

1. For the detailed cost analysis of alternatives, the expenditures required to complete each measure are estimated in terms of both capital and annual operation, maintenance and monitoring (OM&M) costs. Given these values, a present-worth calculation for each alternative can be made for comparison.

2. Capital costs consist of direct and indirect costs. Direct costs include the cost of construction, equipment, land and site development, treatment, transportation and disposal. Indirect costs include engineering expenses, license or permit costs, and contingency allowances.

3. Annual OM&M costs are postconstruction costs required to assure the continued effectiveness of the remedial action. Components of annual OM&M costs include the costs of operating labor, maintenance materials and labor, auxiliary materials and energy, residue disposal, purchased services, administration, insurance, taxes, licensing, maintenance reserve and contingency funds, rehabilitation, monitoring and periodic site reviews.

4. Expenditures that occur over different time periods are analyzed using present-worth, which discounts future costs to a common base year. Present-worth analysis allows costs of remedial alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in a base year and disbursed as needed, would be sufficient to cover costs associated with the life of the remedial project. Assumptions associated with the present-worth calculations include a discount rate of 3.5 percent before taxes and after inflation (this was the difference between the Consumer Price Index and the 30-year Long Bond when the cost estimates were originally done), cost estimates in the planning years in constant dollars, and a period of performance that would vary depending on the activity, but would not exceed 30 years.

5. The cost estimates for these SFS alternatives are presented below. These costs are provided to an accuracy of plus 50 percent to minus 30 percent. The alternative cost estimates are in 2000 dollars and are based on conceptual design from information available at the time of this study. The actual cost of the project will depend on the final scope and design of the selected remedial alternative, the schedule of implementation, competitive market conditions and other variables. Most of these factors are not expected to affect the relative cost differences between alternatives.

7.2.8 STATE/SUPPORT AGENCY ACCEPTANCE

1. This assessment evaluates the technical and administrative issues and concerns the state may have regarding each of the alternatives. This criterion is not discussed in this report, but will be addressed in the ROD once comments on the SFS have been received.

7.2.9 COMMUNITY ACCEPTANCE

1. This assessment evaluates the issues and concerns the public may have regarding each of the alternatives. As with state acceptance, this criterion is not discussed in this report, but will be addressed in the ROD once comments on the SFS have been received.

7.3 COMPLIANCE WITH ARARs ANALYSIS

1. Section 7.3 provides a detailed analysis of the ARARs for each remedial alternative.

7.3.1 ALTERNATIVE 1

7.3.1.1 <u>Alternative 1 (No Further Action) Evaluation</u>

1. The ARARs were individually reviewed to evaluate whether they were applicable, relevant and appropriate or not germane to this alternative. The alternative was then analyzed for its compliance with the ARARs. This evaluation is summarized in Table 7.1 and discussed below. Alternative 1 is the "No Further Action" alternative consisting only of ground water monitoring, and is not considered a remedial technology. "No Further Action," as presented herein, implies that further Remedial Actions would not be taken.

2. The "No Further Action" alternative is required by the NCP and must be considered in the Remedial Action evaluation. It is retained to provide a basis for comparison with other actions. The ARARs germane to this alternative include ARARs 2-4 and 48 (the ARAR numbers used herein are the same as those in Table 7.1). Alternative 1 will not comply with ARARs 2-4 as it provides for the ground water monitoring portion and does not include treatment. The present ground water monitoring program in place at the Site complies with ARAR 48 and will be continued after closure. The remaining ARARs are not germane to Alternative 1 as the "No Further Action" alternative does not allow for Remedial Actions to comply with the regulations.

7.3.1.2 Conclusions

1. Alternative 1 is the "No Further Action" alternative. The NCP requires that "No Further Action" be considered in the remedial action evaluation and is therefore retained to provide a basis for comparison with other Remedial Actions. The "No Further Action" alternative as presented, implies that further Remedial Action would not be taken. For this project the EPA has included ground water monitoring to document site conditions.

TABLE 7.1

COMPARISON OF ALTERNATIVE 1 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	COMMENTS
Chemical-Specific - Water Quality[2]								
1	1a. CWA- Title 33 USC /1251-1387.	x					x	
	1b. NPDES - Title 40 CFR Part 122.	x					x	
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x					x	
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x					x	
2	2a. SDWA - Title 42 USC /300f-300j-26.		x			x		Monitoring only.
	2b. California Safe Drinking Water Act - California Health and Safety Code /116270-116751.		x			x		
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x			x		
	2d. Primary Drinking Water Quality Standards - Title°22 CCR, Ch. 15, /64431 and /64444.		x			x		
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - /13170 and /13241.	x				x		Monitoring only.
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x				x		
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x			x		Monitoring only.
Chemical-Specific - Air Quality								
5	5a. CAA - Title 42 USC /7401 et seq.	x					x	
	5b. NAAQS - Title 40 CFR /50.1-50.11.	x					x	
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, /70101 and°/70200.	x					x	

TABLE 7.1

COMPARISON OF ALTERNATIVE 1 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
6	6a. CAA - Title 42 USC /7401 et seq.		x				x	
	6b. NESHAPs - Title 40 CFR Part 61.		x				x	
	6c. SCAQMD Regulation X - Adopting Federal°Standards.		x				x	
7	7a. CAA - Title 42 USC /7401 et seq.		x				x	
	7b. NSPSs -Title 40 CFR Part 60.		x				x	
	7c. SCAQMD Regulation IX - Adopting Federal°Standards.		x				x	
8	8a. ARA - California Health and Safety Code°/39000°et seq.	x					x	
	8b. California SIP.	x					x	
Chemical-Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x					x	
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x					x	
10	10a. RCRA - Title 42 USC /6901 et seq.	x					x	
	10b. HWCA - California Health and Safety Code, Div.°20, Ch. 6.5 /25100 et seq.	x					x	
	10c. Criteria for Identifying Hazardous Wastes - Title°22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x					x	
Chemical-Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x				x	
Location-Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x					x	

TRC
Customer-Focused Solutions

TABLE 7.1

COMPARISON OF ALTERNATIVE 1 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
13	13a. ESA - Title 16 USC ⁄1531-1534.	x					x	
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x					x	
	13c. Environmental Protection Agency - Title 40 CFR˚⁄6.302(h).	x					x	
	13d. California Endangered Species Act - California Fish and Game Code ⁄2050-2098.	x					x	
Location-Specific - Land Use								
14	14a. AHPA - Title 16 USC ⁄469 et seq.	x					x	Onsite excavation will not occur.
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x					x	
15	15a. Postclosure Land Use - Title 27 CCR ⁄21190.		x				x	
Action-Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR ⁄66264.170-62264.178.		x				x	
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch. 12, ⁄66262.10-66262.89.	x					x	
18	18a. Land Disposal Requirements - Title 22 CCR, Div.˚4.5, Ch. 18, ⁄66268.1, et seq. (onsite and offsite disposal).	x						
19	19a. Transportable and Fixed Treatment Units - Title˚22 CCR, Div. 4.5, Ch. 45, ⁄67450.3.	x					x	
20	20a. RCRA - Closure and Postclosure for Landfill Closures - Title 22 CCR˚⁄66264.111-66264.120.		x				x	

TABLE 7.1

COMPARISON OF ALTERNATIVE 1 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
21	21a. CAMU - Title 22 CCR ⁄66264.552 and ⁄66264.553.		x				x	Wastes will not be excavated.
22	22a. SWMA - Title 27 CCR ⁄20919.		x				x	
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR ⁄ 20921.		x				x	
24	24a. Monitoring During Closure and Postclosure Title 27 CCR ⁄20923.		x				x	
25	25a. Perimeter Monitoring During Closure and Postclosure - Title 27 CCR ⁄20925.		x				x	
26	26a. Structure Monitoring During Closure and Postclosure - Title 27 CCR ⁄20931.		x				x	
27	27a. Monitoring Parameters During Closure and Postclosure - Title 27 CCR ⁄20932.		x				x	
28	28a. Monitoring Frequency During Closure and Postclosure - Title 27 CCR ⁄20933.		x				x	
29	29a. Landfill Gas Control - Title 27 CCR ⁄20937.		x				x	
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR ⁄20800.		x				x	
31	31a. Drainage and Erosion Control - Title 27 CCR ⁄21150.	x					x	
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR ⁄20650.		x				x	
33	33a. Security at Closed Sites - Title 27 CCR ⁄21135.		x				x	
34	34a. Final Cover Standards - Title 27 CCR ⁄21140.	x					x	
35	35a. Postclosure Land Use - Title 27 CCR ⁄21190.		x				x	
36	36a. Final Grade - Title 27 CCR ⁄21142.	x					x	
37	37a. Slope Stability (Final Site Face) - Title 27 CCR ⁄21145.	x					x	

TRC
Customer-Focused Solutions

TABLE 7.1

COMPARISON OF ALTERNATIVE 1 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR /21160.	x					x	
39	39a. Leachate Collection and Removal Systems - Title 27 CCR /20340.		x				x	
40	40a. Precipitation and Drainage Controls - Title 27 CCR /20365.		x				x	
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR /20310 (d), /20320 and /20360.		x				x	
42	42a. Vadose Zone Monitoring - Title 27 CCR /20415 (d).		x				x	
43	43a. Postclosure Care and Use of Property - Title 27 CCR /21180.	x					x	
44	44a. Closure and Postclosure Care - Title 22 CCR /66264.310.		x				x	
45	45a. Seismic Design Standards - Title 22 CCR /66264.25 (b).		x				x	
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR /21090.	x					x	
Action-Specific - Water Quality (2)								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch. 14, Art. 6, /66264.95-66264.99.		x				x	Monitoring only.
48	48a. Ground Water Monitoring - Title 27 CCR /20405, /20415-20430.		x		x			Monitoring only.

TABLE 7.1

COMPARISON OF ALTERNATIVE 1 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
49	49a. SWRCB - Porter-Cologne Water Quality Control Act - §13000, §13140 and §13240.	x					x	Monitoring only.
	49b. SWRCB Resolution No. 88-63.	x					x	
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x					x	
50	50a. SWRCB Resolution No. 68-16.		x				x	Monitoring only.
50A	50A. SDWA - Title 40 CFR §300f, et seq.; 40 CFR Part 144 §3020.						x	Monitoring only.
Action-Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, §39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x					x	
52	52a. Nuisance - Rule 402.	x					x	
53	53a. Fugitive Dust - Rule 403.	x					x	
54	54a. Particulate Matter (Concentration) - Rule 404.	x					x	
55	55a. Solid Particulate Matter - Rule 405.	x					x	
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x					x	
57	57a. Circumvention - Rule 408.	x					x	
58	58a. Combustion - Rule 409.	x					x	SVE units are not part of this alternative.
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x					x	SVE units are not part of this alternative.
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	Emulsified asphalt will not be used.
61	61a. Excavation of Landfill Site - Rule 1150.		x				x	Onsite excavation will not occur.
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x					x	Onsite excavation will not occur.

TABLE 7.1

COMPARISON OF ALTERNATIVE 1 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
To Be Considered Criteria								
63	63a. USEPA Region IX Preliminary Remediation Goals.			x			x	
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x			x	
65	65a. Use of Area of Contamination Concept During RCRA Cleanups: Memo March 13, 1996.			x			x	
	65b. NCP Title 55 FR Pages 8758-8760 (March 8, 1990).			x			x	
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x					x	

94-256/Rpts/ARARs/Tbls&Figs (7/13/00/ks)

(1) ARAR is not germane to Alternative 1.
(2) Although not considered a remedial technology, Alternative 1 has been included here for comparison purposes. This "No Further Action" alternative, implies that further Remedial Actions would not be taken.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.3.2 ALTERNATIVE 2

7.3.2.1 Alternative 2 Evaluation

1. The ARARs were individually reviewed to evaluate whether they were applicable or relevant and appropriate to this alternative. The alternative was then analyzed for its compliance with the ARARs. This evaluation is summarized in Table 7.2 and is discussed below. Several ARARs, although generally applicable or relevant and appropriate to remedial actions, do not apply since the activities regulated by such ARARs are not part of Alternative 2 (ARARs 2-4, 18, 21, 50A, 58 to 62 and 65) and are designated "Not Germane to this Alternative." The ARAR numbers used herein are the same as those in Table 7.2.

7.3.2.1.1 Chemical Specific - Water Quality

1. ARAR 1 establishes requirements for industrial and construction activities to assure that potential stormwater discharges do not violate surface water quality standards. These requirements would apply to landfill cover drainage control, surface water discharge and run-off, and construction activities associated with Alternative 2. The substantive, not the administrative (i.e., permitting) requirements of this ARAR would apply. Compliance with these requirements will be achieved by engineering and institutional controls to minimize or eliminate pollutants in stormwater discharges and monitoring to demonstrate compliance.

2. ARARs 2-4 establish permissible contaminant concentration levels and/or water quality cleanup objectives, which are applicable to ground water and/or surface waters. Construction and Operation and Maintenance (O&M) activities associated with Alternative 2 will be monitored to determine compliance with these levels and cleanup objectives. Ground water Remedial Actions other than monitoring are not included in Alternative 2; hence, these ARARs are "Not Germane to this Alternative."

7.3.2.1.2 Chemical Specific - Air Quality

1. ARARs 5-7 establish certain air quality or emission standards (NAAQS, NESHAPs, and NSPS). ARAR 8 is the California State Implementation Plan (SIP) which describes how air quality programs will be implemented. These ARARs apply to soil and landfill gas. The soil gas engineering controls, including the gas collection system beneath the Resource Conservation and Recovery Act (RCRA)-equivalent cap over the reservoir, and equipment, will be designed to meet these air quality and emissions standards during construction and O&M of Alternative 2 activities. However, Alternative 2 does not anticipate using flares or other thermal systems to treat extracted gas. New Source Review regulations would not be triggered by Alternative 2.

7.3.2.1.3 Chemical Specific - Waste Delineation And Management

1. ARAR 9 establishes requirements for storage and disposal of polychlorinated biphenols (PCBs) and ARAR 10 establishes criteria and methods for characterizing hazardous waste. The reservoir liquids extracted from the reservoir leachate collection point (LCPs), as well as other wastes generated as part of Alternative 2, will be characterized, stored, treated and disposed in accordance with the requirements of these ARARs.

2. The LCPs will be monitored and if leachate is found it will be collected and analyzed. If the leachate is found to be hazardous it will be managed, packaged, transported and disposed in accordance with these ARARs.

7.3.2.1.4 Chemical Specific - Landfill Gases

1. ARAR 11 requires control of the methane concentration in landfill gas. The soil gas engineering controls will be designed to meet these standards and monitoring will be implemented to assure compliance.

7.3.2.1.5 Location Specific - Migratory Birds And Endangered Species

1. ARARs 12 and 13 protect migratory birds and endangered or threatened species and their habitat, respectively, at hazardous waste sites. Migratory birds or endangered or threatened species or habitat have not been identified at the Site, hence these location-specific ARARs would be met by this alternative. If migratory birds or endangered and threatened species are encountered at the Site during remediation, the procedures and these ARARs for protection of the birds, endangered or threatened species, or habitat will be followed.

7.3.2.1.6 Location Specific - Land Use

1. ARAR 14 requires recovery and preservation of archaeological and historical artifacts. Such artifacts have not been identified at the Site, but if they are discovered during Alternative 2 remediation activity, the substantive requirements of these ARARs will be followed.
   ARAR 15 provides for postclosure design and construction requirements for buildings on the Site and within 1,000 feet of the waste holding area. These requirements will be met through the use of engineering and institutional controls. (Discussed in more detail below at ARAR 35 and in Section 5.1.2.)

7.3.2.1.7 Action Specific - Waste Management

1. ARARs 16 and 17 establish standards for the onsite management and documentation of hazardous wastes. ARAR 18 prohibits land disposal of contaminated wastes and establishes concentration limits and treatment criteria for such disposal. ARAR 19 establishes requirements for transportable and fixed soil vapor extraction (SVE) treatment units. Engineering controls will be implemented to assure that reservoir liquids extracted from the LCPs would be managed in accordance with ARARs 16 and 17. ARAR 18 is applicable as leachate will be extracted from the reservoir as part of Alternative 2. Reservoir liquids including oil, PCBs and water will be disposed offsite in accordance with applicable regulations. To the extent that transportable or fixed treatment units are used in the remediation, soil gas engineering controls will be designed to meet the ARAR 19 requirements. It is not anticipated that other solid waste will be generated.

7.3.2.1.8 Action Specific - Landfill Closure

1. ARARs 20-46 are requirements for landfill closures. Certain landfill closure requirements applicable to landfill cap design, construction and monitoring would be applicable or relevant and appropriate to Alternative 2 since it involves construction of an RCRA-equivalent cap over the reservoir. This alternative complies with landfill closure and postclosure requirements. The approach that will be followed to comply with these ARARs is described below:

   ARAR 20 establishes closure requirements for landfills. These requirements will be achieved through the design and construction of the RCRA-equivalent cap and monofill cap.

   ARAR 21 establishes that consolidation and placement into a corrective action management unit of remediation wastes generated as part of a corrective action does not constitute placement or land disposal of hazardous waste. It prohibits creation of unacceptable risks to humans and the environment resulting from exposure. These requirements will be met during the design, construction and maintenance of the cap. The extracted liquids will meet container requirements (see 9 and 10).

   ARAR 22 requires monitoring and gas control of landfill gas that may present a hazard or nuisance. This is achieved in Alternative 2 which includes a gas control system beneath the cap and gas control measures that will be implemented as needed. The substantive requirements of the ARAR will be achieved during design and construction of the cap.

   ARAR 23 establishes requirements for control of trace gases to prevent exposure. It also requires closure and postclosure activities to continue for 30 years, and that modification of systems be made to reflect changing land uses. This ARAR is applicable because gas monitoring and control measures will be included. The substantive requirements of the ARAR will be achieved during design and construction of the cap and through implementation of institutional controls as discussed in Section 5.1.2.

ARAR 24 establishes specific requirements for the landfill gas monitoring system, including adjacent land use and inhabitable structures within 1,000 feet of disposal site and property boundary. This ARAR is relevant and appropriate and will be part of the monitoring plan.

ARAR 25 establishes requirements for a landfill gas monitoring network around the waste deposit perimeter Site boundary. This ARAR is relevant and appropriate and will be met through the perimeter gas control monitoring program.

ARAR 26 establishes requirements for monitoring inside buildings and onsite structures. This ARAR is relevant and appropriate and will be met through an in-business air monitoring program.

ARAR 27 establishes requirements for sampling of monitoring probes and onsite structures for landfill gas. This ARAR is relevant and appropriate and will be met through the monitoring program, which analyzes for methane and VOCs.

ARAR 28 establishes requirements for quarterly or more frequent monitoring if gas migration or other factors are met. This ARAR is relevant and appropriate and will be met through quarterly monitoring programs.

ARAR 29 establishes specific requirements for the gas control system design and construction and monitoring to prevent methane accumulation and reduce methane levels to below compliance at the property boundary. This ARAR is relevant and appropriate and will be addressed through the design and operation of the gas control system.

ARAR 30 establishes requirements to minimize dust during construction and maintenance of the landfill cover. The substantive requirements of the ARAR will be achieved through dust control measures, such as water sprays, during construction and maintenance of the cover.

ARAR 31 establishes requirements for drainage, erosion control systems and monitoring of these systems so as to prevent contact with waste. The substantive requirements of the ARAR will be achieved during design and postclosure maintenance of the cover and drainage systems.

ARAR 32 establishes grading requirements of disposal areas. The substantive requirements of the ARAR will be achieved through design and postclosure maintenance of the cover and drainage systems.

ARAR 33 establishes requirements for Site security and restrictions of access to protect public health and safety. This ARAR is relevant and appropriate and security measures will be implemented during closure and postclosure. Security will be dependent on the postclosure land use.

ARAR 34 establishes requirements for final cover regarding the control of landfill gas migration and other factors. This ARAR is applicable and will be met through design of the cover including the landfill gas control system.

ARAR 35 establishes requirements for postclosure land use to protect the cover and gas monitoring systems and prevent public contact with the waste, and establishes additional requirements for construction. This ARAR is relevant and appropriate and will be incorporated in the design and maintenance of the cap, and will be considered during postclosure. It will be complied with through institutional controls such as restrictive environmental easements as discussed in Section 5.1.2.

ARARs 36 and 40 establish requirements regarding the final grading of the cover. The substantive requirements of the ARARs will be achieved through design and construction of the cover.

ARAR 37 establishes requirements of the design of the slope stability of the final working face. The substantive requirements of the ARARs will be achieved during design and construction of the cover.

ARAR 38 requires implementation and maintenance of a landfill gas control and leachate contact prevention system. This ARAR is applicable and will be met through the design, construction and implementation of the cap and gas control system. The cap and LCPs will be designed to prevent contact with leachate.

ARAR 39 establishes requirements for a leachate collection and removal system. This ARAR is relevant and appropriate and will be met through the design, construction and implementation of the cover and leachate collection system.

ARAR 41 establishes requirements for containment structures including their design and construction. This ARAR is relevant and appropriate and will be addressed through the construction of barriers, if needed. This alternative includes the construction of drainage channels.

ARAR 42 establishes requirements for vadose zone monitoring for waste constituents. This ARAR will be met through vadose zone monitoring and soil gas monitoring programs.

ARARs 43, 44 and 46 establish requirements for design, construction, and maintenance of cover, maintenance and monitoring programs, leachate collection and removal, ground water monitoring, leak detection, gas control and treatment. These ARARs will be met through the operation and maintenance of the cap and other control and systems.

ARAR 45 establishes seismic requirements specifically relating to landfill closure requirements as they relate to the design, construction and maintenance of the cover. The substantive requirements of the ARARs will be achieved during design and construction of the cap.

7.3.2.1.9 Action Specific - Water Quality

1. ARARs 47 and 48 establish requirements for ground water monitoring. ARARs 49 and 50 establish state policy on treatment levels and maintenance of high water quality for beneficial use by the public. ARARs 49 and 50 will be met through the employment of stormwater run-off protection and other engineering control measures that protect water resources. ARAR 50A is applicable to ground water reinjection. The portions of ARARs 47 and 48 applicable to landfill closure will be met through the Alternative 2 ground water monitoring program. ARAR 50 will be met through the employment of stormwater run-off protection

and other engineering control measures that protect water resources. ARARs 49 and 50A are not at issue with respect to Alternative 2 since this alternative does not involve ground water extraction or treatment.

7.3.2.1.10 Action Specific - Air Quality

1. ARARs 51-57 are South Coast Air Quality Management District (SCAQMD) rules designed to regulate construction and other remediation activities to protect local air quality. These ARARs will be met through engineering controls during construction. ARARs 58-62 regulate activities such as the use of SVE units, onsite excavation, and use of emulsified asphalt, none of which are proposed in Alternative 2 and therefore not germane to this alternative.

7.3.2.1.11 To Be Considered

ARAR 63 establishes Preliminary Remediation Goals (PRG) risk based concentrations evaluated and established at a 1×10^{-6} target level for carcinogens and at a Hazard Index of less than or equal to 1 for noncarcinogens. Soil PRGs can be considered as a soil cleanup standard when no promulgated standard exists. PRGs were used during the initial soil characterization. The EPA is going to determine if these requirements will continue to be applicable or relevant and appropriate for this Site.

ARAR 64 establishes provisional site-specific soil gas standards, which have been used for characterizing in-business air and soil gas. EPA will determine if this ARAR will remain applicable or relevant and appropriate for this Site.

ARAR 65 establishes that consolidation and in-situ treatment of hazardous waste within an area of contamination does not trigger land disposal restrictions or minimum technology requirements. This ARAR is not germane to Alternative 2 since it does not include waste excavation.

ARAR 66 provides guidelines for design of multilayer covers including specific design requirements. These guidelines can be implemented through design and construction.

7.3.2.2 Conclusions

1. Section 7.3.2 and Table 7.2 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 2. As discussed in Section 7.3.2 and Table 7.2, ARARs 2-4, 18, 21, 50A, 58-62 and 65 are designated "Not Germane" since this alternative does not contain a ground water treatment program, onsite excavation, SVE units or the use of emulsified asphalt. Except for the ARARs that have been designated not germane, the remaining ARARs will be complied with in Alternative 2.

TABLE 7.2

COMPARISON OF ALTERNATIVE 2 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	COMMENTS
Chemical-Specific - Water Quality[2]								
1	1a. CWA- Title 33 USC /1251-1387.	x			x			
	1b. NPDES - Title 40 CFR Part 122.	x			x			
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x			x			
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x			x			
2	2a. SDWA - Title 42 USC /300f-300j-26.		x				x	Ground water remediation not included.
	2b. California Safe Drinking Water Act - California Health and Safety Code /116270-116751.		x				x	
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x				x	
	2d. Primary Drinking Water Quality Standards - Title 22 CCR, Ch. 15, /64431 and /64444.		x				x	
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - /13170 and /13241.	x					x	Ground water remediation not included.
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x					x	
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x				x	Ground water remediation not included.
Chemical-Specific - Air Quality								
5	5a. CAA - Title 42 USC /7401 et seq.	x			x			
	5b. NAAQS - Title 40 CFR /50.1 -50.11.	x			x			
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, /70101 and /70200.	x			x			

TABLE 7.2

COMPARISON OF ALTERNATIVE 2 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
6	6a. CAA - Title 42 USC /7401 et seq.		x		x			
	6b. NESHAPs - Title 40 CFR Part 61.		x		x			
	6c. SCAQMD Regulation X - Adopting Federal Standards.		x		x			
7	7a. CAA - Title 42 USC /7401 et seq.		x		x			
	7b. NSPSs -Title 40 CFR Part 60.		x		x			
	7c. SCAQMD Regulation IX - Adopting Federal Standards.		x		x			
8	8a. ARA - California Health and Safety Code /39000 et seq.	x			x			
	8b. California SIP.	x			x			
Chemical-Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x			x			
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x			x			
10	10a. RCRA - Title 42 USC /6901 et seq.	x			x			
	10b. HWCA - California Health and Safety Code, Div. 20, Ch. 6.5 /25100 et seq.	x			x			
	10c. Criteria for Identifying Hazardous Wastes - Title 22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x			x			
Chemical-Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x		x			
Location-Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x			x			

TABLE 7.2

COMPARISON OF ALTERNATIVE 2 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
13	13a. ESA - Title 16 USC /1531-1534.	x			x			
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x			x			
	13c. Environmental Protection Agency - Title 40 CFR /6.302(h).	x			x			
	13d. California Endangered Species Act - California Fish and Game Code /2050-2098.	x			x			
Location-Specific - Land Use								
14	14a. AHPA - Title 16 USC /469 et seq.	x			x			Onsite excavation will not occur.
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x			x			
15	15a. Postclosure Land Use - Title 27 CCR /21190.		x		x			
Action-Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR /66264.170-62264.178.		x		x			
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch. 12, /66262.10-66262.89.	x			x			
18	18a. Land Disposal Requirements - Title 22 CCR, Div. 4.5, Ch. 18, /66268.1, et seq. (onsite and offsite disposal).	x					x	Not triggered by Alternative 2 but will be complied with if triggered by a future activity at the Site.
19	19a. Transportable and Fixed Treatment Units - Title 22 CCR, Div. 4.5, Ch. 45, /67450.3.	x			x			
20	20a. RCRA - Closure and Postclosure for Landfill Closures - Title 22 CCR /66264.111 - 66264.120.		x		x			

TABLE 7.2

COMPARISON OF ALTERNATIVE 2 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
21	21a. CAMU - Title 22 CCR /66264.552 and /66264.553.		x				x	Wastes will not be excavated.
22	22a. SWMA - Title 27 CCR /20919.		x		x			
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR / 20921.		x		x			
24	24a. Monitoring during Closure and Postclosure Title 27 CCR /20923.		x		x			
25	25a. Perimeter Monitoring during Closure and Postclosure - Title 27 CCR /20925.		x		x			
26	26a. Structure Monitoring during Closure and Postclosure - Title 27 CCR /20931.		x		x			
27	27a. Monitoring parameters during Closure and Postclosure - Title 27 CCR /20932.		x		x			
28	28a. Monitoring frequency during Closure and Postclosure - Title 27 CCR /20933.		x		x			
29	29a. Landfill Gas Control - Title 27 CCR /20937.		x		x			
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR /20800.		x		x			
31	31a. Drainage and Erosion Control - Title 27 CCR /21150.	x			x			
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR /20650.		x		x			
33	33a. Security at Closed Sites - Title 27 CCR /21135.		x		x			
34	34a. Final Cover Standards - Title 27 CCR /21140.	x			x			
35	35a. Postclosure Land Use - Title 27 CCR /21190.		x		x			
36	36a. Final Grade - Title 27 CCR /21142.	x			x			
37	37a. Slope Stability (Final Site Face) - Title 27 CCR /21145.	x			x			

TRC
Customer-Focused Solutions

TABLE 7.2

COMPARISON OF ALTERNATIVE 2 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR /21160.	x			x			
39	39a. Leachate Collection and Removal Systems - Title 27 CCR /20340.		x		x			
40	40a. Precipitation and Drainage Controls - Title 27 CCR /20365.		x		x			
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR /20310 (d), /20320 and /20360.		x		x			
42	42a. Vadose Zone Monitoring - Title 27 CCR /20415 (d).		x		x			
43	43a. Postclosure Care and Use of Property - Title 27 CCR /21180.	x			x			
44	44a. Closure and Postclosure Care - Title 22 CCR /66264.310.		x		x			
45	45a. Seismic Design Standards - Title 22 CCR /66264.25 (b).		x		x			
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR /21090.	x			x			
Action-Specific - Water Quality (2)								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch. 14, Art. 6, /66264.95-66264.99.		x		x			Monitoring only.
48	48a. Ground Water Monitoring - Title 27 CCR /20405, /20415-20430.		x		x			Monitoring only.

TABLE 7.2

COMPARISON OF ALTERNATIVE 2 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
49	49a. SWRCB - Porter-Cologne Water Quality Control Act - /13000, /13140 and /13240.	x			x			Ground water remediation not included.
	49b. SWRCB Resolution No. 88-63.	x			x			
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x			x			
50	50a. SWRCB Resolution No. 68-16.		x		x			Ground water remediation not included.
50A	50A SDWA - Title 40 CFR /300f, et seq.; 40 CFR Part 144 /3020.						x	Ground water remediation not included.
Action-Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, /39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x			x			
52	52a. Nuisance - Rule 402.	x			x			
53	53a. Fugitive Dust - Rule 403.	x			x			
54	54a. Particulate Matter (Concentration) - Rule 404.	x			x			
55	55a. Solid Particulate Matter - Rule 405.	x			x			
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x			x			
57	57a. Circumvention - Rule 408.	x			x			
58	58a. Combustion - Rule 409.	x					x	SVE units are not part of this alternative.
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x					x	SVE units are not part of this alternative.
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	Emulsified asphalt will not be used.
61	61a. Excavation of Landfill Site - Rule 1150.		x				x	Onsite excavation will not occur.
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x					x	Onsite excavation will not occur.

TABLE 7.2

COMPARISON OF ALTERNATIVE 2 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
To Be Considered Criteria								
63	63a. USEPA Region IX Preliminary Remediation Goals.			x	x			
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x	x			
65	65a. Use of Area of Contamination Concept during RCRA cleanups: Memo March 13, 1996.			x			x	
	65b. NCP Title 55 FR pages 8758-8760 (March 8, 1990).			x			x	
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x			x			

94-256/Rpts/SFS Rev. 2.0/Tbls&Figs (7/25/00/rm)

(1) ARAR is not germane to Alternative 2 because activities regulated are not part of Alternative 2, but may apply to other alternatives.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.3.3 ALTERNATIVE 3

7.3.3.1 <u>Alternative 3 Evaluation</u>

1. The ARARs were individually reviewed to evaluate whether they were applicable, relevant and appropriate or not germane to this alternative. The alternative was then analyzed for its compliance with the ARARs. This evaluation is summarized in Table 7.3 and is discussed below. Several ARARs, although generally applicable or relevant and appropriate to Remedial Actions, are not germane since the activities regulated by such ARARs are not part of Alternative 3 (ARARs 2-4, 18, 21, 50A, 60, 61, 62 and 65) and are designated "Not Germane to this Alternative." The ARAR numbers used herein are the same as those in Table 7.3.

7.3.3.1.1 Chemical Specific - Water Quality

1. ARAR 1 establishes requirements for industrial and construction activities to assure that potential stormwater discharges do not violate surface water quality standards. These requirements would apply to landfill cover drainage control, surface water discharge and run-off, and construction activities associated with Alternative 3. The substantive, not the administrative (i.e., permitting) requirements of this ARAR would apply. Compliance with these requirements will be achieved by engineering and institutional controls to minimize or eliminate pollutants in stormwater discharges and monitoring to demonstrate compliance.

2. ARARs 2-4 establish permissible contaminant concentration levels and/or water quality cleanup objectives, which are applicable to ground water and/or surface waters. Construction and O&M activities associated with Alternative 3 will be monitored to determine compliance with these levels and cleanup objectives. Ground water Remedial Actions other than monitoring are not included in Alternative 3; hence, these ARARs are not germane to this alternative.

7.3.3.1.2 Chemical Specific - Air Quality

1. ARARs 5-7 establish certain air quality or emission standards (NAAQS, NESHAPs, and NSPS). ARAR 8 is the California SIP which describes how air quality programs will be implemented. These ARARs apply to soil and landfill gas. The soil gas engineering controls, including the gas collection system beneath the RCRA-equivalent cap over the reservoir, and equipment, will be designed to meet these air quality and emissions standards during construction and O&M of Alternative 3 activities. Alternative 3 does not anticipate using

flares or other thermal systems to treat extracted gas. New Source Review regulations would not be triggered by Alternative 3.

7.3.3.1.3 Chemical Specific - Waste Delineation And Management

1. ARAR 9 establishes requirements for storage and disposal of PCBs. ARAR 10 establishes criteria and methods for characterizing hazardous waste. The reservoir liquids extracted from the reservoir LCPs, as well as other wastes generated as part of Alternative 3, will be characterized, stored, treated and disposed in accordance with the requirements of these ARARs.

2. The LCPs will be monitored and if leachate is found it will be collected and analyzed. If the leachate is found to be hazardous it will be managed, packaged, transported and disposed in accordance with these ARARs.

7.3.3.1.4 Chemical Specific - Landfill Gases

1. ARAR 11 requires control of the methane concentration in landfill gas. The soil gas engineering controls will be designed to meet these standards and monitoring will be implemented to assure compliance.

7.3.3.1.5 Location Specific - Migratory Birds And Endangered Species

1. ARARs 12 and 13 protect migratory birds and endangered or threatened species and their habitat, respectively, at hazardous waste sites. Migratory birds and endangered or threatened species or habitat have not been identified at the Site, hence these location-specific ARARs would be met by this alternative. If migratory birds or endangered and threatened species are encountered at the Site during remediation, the procedures of these ARARs for protection of the birds, endangered or threatened species, or habitat will be followed.

7.3.3.1.6 Location Specific - Land Use

1. ARAR 14 requires recovery and preservation of archaeological and historical artifacts. Such artifacts have not been identified at the Site, but if they are discovered during Alternative 3 remediation activity, the substantive requirements of this ARAR will be followed. ARAR 15 provides for postclosure design and construction requirements for buildings on the Site and

within 1,000 feet of the waste holding area. These requirements will be met through the use of engineering and institutional controls. (Discussed in more detail below at ARAR 35 and in Section 5.1.2.)

7.3.3.1.7 Action Specific - Waste Management

1. ARARs 16 and 17 establish standards for the onsite management and documentation of hazardous wastes. ARAR 18 prohibits land disposal of contaminated wastes and establishes concentration limits and treatment criteria for such disposal. ARAR 19 establishes requirements for transportable and fixed SVE treatment units. Engineering controls will be implemented to assure that reservoir liquids extracted from the LCPs would be managed in accordance with ARARs 16 and 17. ARAR 18 is applicable as leachate will be extracted from the reservoir as part of Alternative 3. Reservoir liquids including oil, PCBs and water will be disposed offsite in accordance with applicable regulations. To the extent that transportable or fixed treatment units are used in the remediation, soil gas engineering controls will be designed to meet the ARAR 19 requirements. Excavation or other solid waste generating activity will not be performed during implementation of Alternative 3.

7.3.3.1.8 Action Specific - Landfill Closure

1. ARARs 20-46 are requirements for landfill closures. Certain landfill closure requirements applicable to landfill cap design, construction and monitoring would be applicable or relevant and appropriate to Alternative 3 since it involves construction of an RCRA-equivalent cap over the reservoir. This alternative complies with landfill closure and postclosure requirements. The approach that will be followed to comply with these ARARs is described below:

    ARAR 20 establishes closure requirements for landfills. These requirements will be achieved through the design and construction of a RCRA-equivalent cap.

    ARAR 21 establishes that consolidation of remediation wastes generated as part of a corrective action and placement into a corrective action management unit does not constitute placement or land disposal of hazardous waste. Wastes will not be excavated in Alternative 3; hence, this ARAR is not germane.

    ARAR 22 requires monitoring and gas control when landfill gas may present a hazard or nuisance. This is achieved in Alternative 3 by inclusion of a gas control system beneath the cap and gas control measures that will be implemented as needed. The substantive requirements of the ARAR will be achieved during design and construction of the cap.

TRC
Customer-Focused Solutions

ARAR 23 establishes requirements for control of trace gases to prevent exposure. It also requires closure and postclosure activities to continue for 30 years, and that modification of systems be made to reflect changing land uses. The substantive requirements of the ARAR will be achieved during design and construction of the cap and through implementation of institutional controls as discussed in Section 5.1.2.

ARAR 24 establishes specific requirements for landfill gas monitoring systems, including adjacent land use and inhabitable structures within 1,000 feet of disposal site and property boundary. This ARAR will be complied with through measures included in the Site monitoring plan.

ARAR 25 establishes requirements for a landfill gas monitoring network around the waste deposit perimeter Site boundary. This ARAR will be met through implementation of the perimeter gas control monitoring program.

ARAR 26 establishes requirements for gas monitoring inside buildings and onsite structures. This ARAR will be complied with through an in-business air monitoring program.

ARAR 27 establishes requirements for sampling of monitoring probes and onsite structures for landfill gas. This ARAR will be complied with through the Site monitoring program, which includes collection and analysis of samples for methane and VOCs.

ARAR 28 establishes requirements for quarterly monitoring, or more frequent if gas migration or other factors are met. This ARAR will be complied with through the Site monitoring program.

ARAR 29 establishes specific requirements for the gas control system design, construction and monitoring to prevent methane accumulation and reduce methane levels to below compliance at the property boundary. This ARAR will be complied with through the design and operation of the gas control system.

ARAR 30 establishes requirements to minimize dust during construction and maintenance of the landfill cover. The substantive requirements of the ARAR will be achieved through dust control measures, such as water sprays, taken during construction and maintenance of the cover.

ARAR 31 establishes requirements for drainage and erosion control systems and monitoring of these systems so as to prevent contact with waste. The substantive requirements of the ARAR will be achieved during design and postclosure maintenance of the cover and drainage systems.

ARARs 32, 36 and 40 establish grading requirements of the disposal area to promote lateral run-off of precipitation and to prevent ponding. The substantive requirements of the ARARs will be achieved through design and postclosure maintenance of the cover and drainage systems. Specifically the cap will be designed and built with minimum grades recommended in EPA guidance documents.

ARAR 33 establishes requirements for Site security and restrictions of access to protect public health and safety. This ARAR will be complied with through implementation of security measures (e.g., fences and institutional controls) during closure and postclosure. Security will be dependent on the postclosure land use.

ARAR 34 establishes requirements for final cover regarding the control of landfill gas migration and other factors. This ARAR will be complied with through inclusion of a landfill gas control system beneath the cap.

ARAR 35 establishes requirements for postclosure land use to protect the cover and gas monitoring systems and prevent public contact with the waste. This ARAR will be complied with in the design and maintenance of the cap, and through implementation of institutional controls such as restrictive easements as discussed in Section 5.1.2.

ARARs 37 and 45 establish requirements for the slope stability of the final cover. The substantive requirements of the ARARs will be complied with by designing and constructing cover slopes that will be stable under both static and dynamic (i.e., earthquake) conditions.

ARAR 38 requires implementation and maintenance of a landfill gas control and leachate contact prevention system. This ARAR will be complied with through the design, construction and implementation of the gas control system beneath the cap and the reservoir LCPs.

ARAR 39 establishes requirements for a leachate collection and removal system. This ARAR will be complied with through the design, construction and implementation of the reservoir LCPs.

ARAR 41 establishes requirements for containment structures including their design and construction. This ARAR will be complied with through the construction of subsurface barriers, if needed.

ARAR 42 establishes requirements for vadose zone monitoring for waste constituents. This ARAR will be complied with through vadose zone monitoring and soil gas monitoring programs.

ARARs 43, 44 and 46 establish requirements for design, construction, and maintenance of cover, maintenance and monitoring programs, leachate collection and removal, ground water monitoring, leak detection, and gas control and treatment. These ARARs will be complied with through the O&M of the cap and other control and monitoring systems.

7.3.3.1.9 Action Specific - Water Quality

1. ARARs 47 and 48 establish requirements for ground water monitoring. The portions of ARARs 47 and 48 applicable to landfill closure will be met through the Alternative 3 ground water monitoring program. ARARs 49 and 50 establish state policy on treatment levels and maintenance of high water quality for beneficial use by the public. ARARs 49 and 50 will be complied with through the employment of stormwater run-off protection and other engineering control measures that protect water resources. ARAR 50A is applicable to ground water reinjection. ARAR 50A is not germane with respect to Alternative 3 since this alternative does not involve ground water extraction or treatment.

7.3.3.1.10 Action Specific - Air Quality

1. ARARs 51-57 are SCAQMD rules designed to regulate construction and other remediation activities to protect local air quality. These ARARs will be complied with through engineering controls during construction. ARARs 58 and 59 regulate the use of SVE units, and will be complied with. ARARs 60-62 regulate activities such as emulsified asphalt and onsite construction which are not proposed in Alternative 3, therefore they are not germane to this alternative.

7.3.3.1.11 To Be Considered

ARAR 63 establishes PRGs which are risk based concentrations evaluated and established at a 1×10^{-6} target level for carcinogens and at a Hazard Index of less than or equal to 1 for noncarcinogens. Soil PRGs can be considered as a soil cleanup standard when no promulgated standard exists. PRGs were used during the initial soil characterization at the Site. The EPA is going to determine if these requirements will continue to be applicable or relevant and appropriate for this Site.

ARAR 64 establishes provisional site-specific soil gas standards, which have been used for characterizing in-business air and soil gas. EPA will determine if this ARAR will remain applicable or relevant and appropriate for this Site.

ARAR 65 establishes that consolidation and in-situ treatment of hazardous waste within an area of contamination does not trigger land disposal restrictions or minimum technology requirements. This ARAR is not germane to Alternative 3 since it does not include waste excavation.

ARAR 66 provides guidelines for design of multilayer covers including specific design requirements. Germane portions of this ARAR can be implemented during design and construction of the asphalt cap.

7.3.3.2 Conclusions

1. Section 7.3.3 and Table 7.3 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 3. As discussed in Section 7.3.3 and Table 7.3, ARARs 2-4, 18, 21, 50A, 60-62 and 65 are designated "Not Germane" since this alternative does not contain a ground water treatment program, onsite excavation, or the use of emulsified asphalt. Except for the ARARs that have been designated not germane, the remaining ARARs will be complied with in Alternative 3.

TABLE 7.3

COMPARISON OF ALTERNATIVE 3 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	COMMENTS
Chemical-Specific - Water Quality[2]								
1	1a. CWA- Title 33 USC ⁄1251-1387.	x			x			
	1b. NPDES - Title 40 CFR Part 122.	x			x			
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x			x			
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x			x			
2	2a. SDWA - Title 42 USC ⁄300f-300j-26.		x				x	Ground water remediation not included.
	2b. California Safe Drinking Water Act - California Health and Safety Code ⁄116270-116751.		x				x	
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x				x	
	2d. Primary Drinking Water Quality Standards - Title 22 CCR, Ch. 15, ⁄64431 and ⁄64444.		x				x	
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - ⁄13170 and ⁄13241.	x					x	Ground water remediation not included.
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x					x	
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x				x	Ground water remediation not included.
Chemical-Specific - Air Quality								
5	5a. CAA - Title 42 USC ⁄7401 et seq.	x			x			
	5b. NAAQS - Title 40 CFR ⁄50.1 -50.11.	x			x			
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, ⁄70101 and ⁄70200.	x			x			

TABLE 7.3

COMPARISON OF ALTERNATIVE 3 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
6	6a. CAA - Title 42 USC /7401 et seq.		x		x			
	6b. NESHAPs - Title 40 CFR Part 61.		x		x			
	6c. SCAQMD Regulation X - Adopting Federal Standards.		x		x			
7	7a. CAA - Title 42 USC /7401 et seq.		x		x			
	7b. NSPSs -Title 40 CFR Part 60.		x		x			
	7c. SCAQMD Regulation IX - Adopting Federal Standards.		x		x			
8	8a. ARA - California Health and Safety Code /39000 et seq.	x			x			
	8b. California SIP.	x			x			
Chemical-Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x			x			
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x			x			
10	10a. RCRA - Title 42 USC /6901 et seq.	x			x			
	10b. HWCA - California Health and Safety Code, Div. 20, Ch. 6.5 /25100 et seq.	x			x			
	10c. Criteria for Identifying Hazardous Wastes - Title 22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x			x			
Chemical-Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x		x			
Location-Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x			x			

TABLE 7.3

COMPARISON OF ALTERNATIVE 3 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
13	13a. ESA - Title 16 USC /1531-1534.	x			x			
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x			x			
	13c. Environmental Protection Agency - Title 40 CFR /6.302(h).	x			x			
	13d. California Endangered Species Act - California Fish and Game Code /2050-2098.	x			x			
Location-Specific - Land Use								
14	14a. AHPA - Title 16 USC /469 et seq.	x			x			Onsite excavation will not occur.
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x			x			
15	15a. Postclosure Land Use - Title 27 CCR /21190.		x		x			
Action-Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR /66264.170-62264.178.		x		x			
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch. 12, /66262.10-66262.89.	x			x			
18	18a. Land Disposal Requirements - Title 22 CCR, Div. 4.5, Ch. 18, /66268.1, et seq. (onsite and offsite disposal).	x					x	Not triggered by Alternative 3 but will be complied with if triggered by a future activity at the Site.
19	19a. Transportable and Fixed Treatment Units - Title 22 CCR, Div. 4.5, Ch. 45, /67450.3.	x			x			
20	20a. RCRA - Closure and Post Closure for Landfill Closures - Title 22 CCR /66264.111 - 66264.120.		x		x			

TRC
Customer-Focused Solutions

TABLE 7.3

COMPARISON OF ALTERNATIVE 3 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
21	21a. CAMU - Title 22 CCR /66264.552 and /66264.553.		x				x	Wastes will not be excavated.
22	22a. SWMA - Title 27 CCR /20919.		x		x			
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR / 20921.		x		x			
24	24a. Monitoring During Closure and Postclosure Title 27 CCR /20923.		x		x			
25	25a. Perimeter Monitoring During Closure and Postclosure - Title 27 CCR /20925.		x		x			
26	26a. Structure Monitoring During Closure and Postclosure - Title 27 CCR /20931.		x		x			
27	27a. Monitoring parameters during Closure and Postclosure - Title 27 CCR /20932.		x		x			
28	28a. Monitoring frequency during Closure and Postclosure - Title 27 CCR /20933.		x		x			
29	29a. Landfill Gas Control - Title 27 CCR /20937.		x		x			
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR /20800.	x	x		x			
31	31a. Drainage and Erosion Control - Title 27 CCR /21150.	x			x			
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR /20650.		x		x			
33	33a. Security at Closed Sites - Title 27 CCR /21135.		x		x			
34	34a. Final Cover Standards - Title 27 CCR /21140.	x			x			
35	35a. Postclosure Land Use - Title 27 CCR /21190.		x		x			
36	36a. Final Grade - Title 27 CCR /21142.	x			x			
37	37a. Slope Stability (Final Site Face) - Title 27 CCR /21145.	x			x			

TABLE 7.3

COMPARISON OF ALTERNATIVE 3 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	COMMENTS
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR ⁄21160.	x			x			
39	39a. Leachate Collection and Removal Systems - Title 27 CCR ⁄20340.		x		x			
40	40a. Precipitation and Drainage Controls - Title 27 CCR ⁄20365.		x		x			
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR ⁄20310 (d), ⁄20320 and ⁄20360.		x		x			
42	42a. Vadose Zone Monitoring - Title 27 CCR ⁄20415 (d).		x		x			
43	43a. Postclosure Care and Use of Property - Title 27 CCR ⁄21180.	x			x			
44	44a. Closure and Postclosure Care - Title 22 CR ⁄66264.310.		x		x			
45	45a. Seismic Design Standards - Title 22 CCR ⁄66264.25 (b).		x		x			
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR ⁄21090.		x		x			
Action-Specific - Water Quality (2)								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch. 14, Art. 6, ⁄66264.95-66264.99.		x		x			Monitoring only.
48	48a. Ground Water Monitoring - Title 27 CCR ⁄20405, ⁄20415-20430.		x		x			Monitoring only.

TABLE 7.3

COMPARISON OF ALTERNATIVE 3 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
49	49a. SWRCB - Porter-Cologne Water Quality Control Act - /13000, /13140 and /13240.	x			x			Ground water remediation not included.
	49b. SWRCB Resolution No. 88-63.	x			x			
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x			x			
50	50a. SWRCB Resolution No. 68-16.		x		x			Ground water remediation not included.
50A	50A. SDWA - Title 40 CFR /300f, et seq.; 40 CFR Part 144 /3020.						x	Ground water remediation not included.
Action-Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, /39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x			x			
52	52a. Nuisance - Rule 402.	x			x			
53	53a. Fugitive Dust - Rule 403.	x			x			
54	54a. Particulate Matter (Concentration) - Rule 404.	x			x			
55	55a. Solid Particulate Matter - Rule 405.	x			x			
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x			x			
57	57a. Circumvention - Rule 408.	x			x			
58	58a. Combustion - Rule 409.	x			x			
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x			x			
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	Emulsified asphalt will not be used.
61	61a. Excavation of Landfill Site - Rule 1150.		x				x	Onsite excavation will not occur.
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x					x	Onsite excavation will not occur.

TABLE 7.3

COMPARISON OF ALTERNATIVE 3 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
To Be Considered Criteria								
63	63a. USEPA Region IX Preliminary Remediation Goals.			x	x			
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x	x			
65	65a. Use of Area of Contamination Concept during RCRA cleanups: Memo March 13, 1996.	x			x			
	65b. NCP Title 55 FR pages 8758-8760 (March 8, 1990).			x			x	
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x			x			

94-256/Rpts/SFS Rev. 2.0/Tbls&Figs (7/25/00)/rm)

(1) ARAR is not germane to Alternative 3 because activities regulated are not part of Alternative 3, but may apply to other alternatives.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.3.4 ALTERNATIVE 4

7.3.4.1 Alternative 4 Evaluation

1. The ARARs were individually reviewed to evaluate whether they were applicable, relevant and appropriate or not germane to this alternative. The alternative was then analyzed for its compliance with the ARARs. This evaluation is summarized in Table 7.4 and is discussed below. Several ARARs, although generally applicable or relevant and appropriate to Remedial Actions, are not germane since the activities regulated by such ARARs are not part of Alternative 4 (ARARs 2-4, 50A and 60) and are designated "Not Germane to this Alternative." The ARAR numbers used herein are the same as those in Table 7.4.

7.3.4.1.1 Chemical Specific - Water Quality

1. ARAR 1 establishes requirements for industrial and construction activities to assure that potential stormwater discharges do not violate surface water quality standards. These requirements would apply to landfill cover drainage control, surface water discharge and run-off, and construction activities associated with Alternative 4. The substantive, not the administrative (i.e., permitting) requirements of this ARAR would apply. Compliance with these requirements will be achieved by engineering and institutional controls to minimize or eliminate pollutants in stormwater discharges and monitoring to demonstrate compliance.

2. ARARs 2-4 establish permissible contaminant concentration levels and/or water quality cleanup objectives, which are applicable to ground water and/or surface waters. Construction and O&M activities associated with Alternative 4 will be monitored to determine compliance with these levels and cleanup objectives. Ground water Remedial Actions other than monitoring are not included in Alternative 4; hence, these ARARs are not germane to this alternative.

7.3.4.1.2 Chemical Specific - Air Quality

1. ARARs 5-7 establish certain air quality or emission standards (NAAQS, NESHAPs, and NSPS). ARAR 8 is the California SIP which describes how air quality programs will be implemented. These ARARs apply to soil and landfill gas. The soil gas engineering controls, including the gas collection system beneath the RCRA-equivalent cap over the reservoir, and equipment, will be designed to meet these air quality and emissions standards during

construction and O&M of Alternative 4 activities. Alternative 4 does not anticipate using flares or other thermal systems to treat extracted gas. New Source Review regulations would not be triggered by Alternative 4.

7.3.4.1.3 Chemical Specific - Waste Delineation And Management

1. ARAR 9 establishes requirements for storage and disposal of PCBs. ARAR 10 establishes criteria and methods for characterizing hazardous waste. The reservoir liquids extracted from the reservoir LCPs, as well as other wastes generated as part of Alternative 4, will be characterized, stored, treated and disposed in accordance with the requirements of these ARARs.

2. The LCPs will be monitored and if leachate is found it will be collected and analyzed. If the leachate is found to be hazardous will be managed, packaged, transported and disposed in accordance with these ARARs.

7.3.4.1.4 Chemical Specific - Landfill Gases

1. ARAR 11 requires control of the methane concentration in landfill gas. The soil gas engineering controls will be designed to meet these standards and monitoring will be implemented to assure compliance.

7.3.4.1.5 Location Specific - Migratory Birds And Endangered Species

1. ARARs 12 and 13 protect migratory birds and endangered or threatened species and their habitat, respectively, at hazardous waste sites. Migratory birds and endangered or threatened species or habitat have not been identified at the Site, hence these location-specific ARARs would be met by this alternative. If migratory birds and endangered or threatened species are encountered at the Site during remediation, the procedures of these ARARs for protection of the birds, endangered or threatened species, or habitat will be followed.

7.3.4.1.6 Location Specific - Land Use

1. ARAR 14 requires recovery and preservation of archaeological and historical artifacts. Such artifacts have not been identified at the Site, but if they are discovered during Alternative 4 remediation activity, the substantive requirements of this ARAR will be followed.

ARAR 15 provides for postclosure design and construction requirements for buildings on the Site and within 1,000 feet of the waste holding area. These requirements will be met through the use of engineering and institutional controls. (Discussed in more detail below at ARAR 35 and in Section 5.1.2.)

7.3.4.1.7 Action Specific - Waste Management

1. ARARs 16 and 17 establish standards for the onsite management and documentation of hazardous wastes. ARAR 18 prohibits land disposal of contaminated wastes and establishes concentration limits and treatment criteria for such disposal. ARAR 19 establishes requirements for transportable and fixed SVE treatment units. Engineering controls will be implemented to assure that reservoir liquids extracted from the LCPs would be managed in accordance with ARARs 16 and 17. ARAR 18 is applicable as leachate will be extracted from the reservoir as part of Alternative 4. Reservoir liquids including oil, PCBs and water will be disposed offsite in accordance with applicable regulations. To the extent that transportable or fixed treatment units are used in the remediation, soil gas engineering controls will be designed to meet the ARAR 19 requirements.

7.3.4.1.8 Action Specific - Landfill Closure

1. ARARs 20-46 are requirements for landfill closures. Certain landfill closure requirements applicable to landfill cap design, construction and monitoring would be applicable or relevant and appropriate to Alternative 4 since it involves construction of an RCRA-equivalent cap over the reservoir. This alternative complies with landfill closure and postclosure requirements. The approach that will be followed to comply with these ARARs is described below:

    ARAR 20 establishes closure requirements for landfills. These requirements will be achieved through the design and construction of a RCRA-equivalent cap.

    ARAR 21 establishes that consolidation of remediation wastes generated as part of a corrective action and placement into a corrective action management unit does not constitute placement or land disposal of hazardous waste. This ARAR will be complied with during excavation and consolidation of the wastes from Areas 1, 6 and 8.

    ARAR 22 requires monitoring and gas control when landfill gas may present a hazard or nuisance. This is achieved in Alternative 4 by inclusion of a gas control system beneath the cap and gas control measures that will be implemented as needed. The substantive requirements of the ARAR will be achieved during design and construction of the cap.

ARAR 23 establishes requirements for control of trace gases to prevent exposure. It also requires closure and postclosure activities to continue for 30 years, and that modification of systems be made to reflect changing land uses. The substantive requirements of the ARAR will be achieved during design and construction of the cap and through implementation of institutional controls as discussed in Section 5.1.2.

ARAR 24 establishes specific requirements for landfill gas monitoring systems, including adjacent land use and inhabitable structures within 1,000 feet of disposal site and property boundary. This ARAR will be complied with through measures included in the Site monitoring plan.

ARAR 25 establishes requirements for a landfill gas monitoring network around the waste deposit perimeter Site boundary. This ARAR will be met through implementation of the perimeter gas control monitoring program.

ARAR 26 establishes requirements for gas monitoring inside buildings and onsite structures. This ARAR will be complied with through an in-business air monitoring program.

ARAR 27 establishes requirements for sampling of monitoring probes and onsite structures for landfill gas. This ARAR will be complied with through the Site monitoring program, which includes collection and analysis of samples for methane and VOCs.

ARAR 28 establishes requirements for quarterly monitoring, or more frequent if gas migration or other factors are met. This ARAR will be complied with through the Site monitoring program.

ARAR 29 establishes specific requirements for the gas control system design, construction and monitoring to prevent methane accumulation and reduce methane levels to below compliance at the property boundary. This ARAR will be complied with through the design and operation of the gas control system.

ARAR 30 establishes requirements to minimize dust during construction and maintenance of the landfill cover. The substantive requirements of the ARAR will be achieved through dust control measures, such as water sprays, taken during construction and maintenance of the cover.

ARAR 31 establishes requirements for drainage and erosion control systems and monitoring of these systems so as to prevent contact with waste. The substantive requirements of the ARAR will be achieved during design and postclosure maintenance of the cover and drainage systems.

ARARs 32, 36 and 40 establish grading requirements of the disposal area to promote lateral run-off of precipitation and to prevent ponding. The substantive requirements of the ARARs will be achieved through design and postclosure maintenance of the cover and drainage systems. Specifically the cap will be designed and built with minimum grades recommended in EPA guidance documents.

ARAR 33 establishes requirements for Site security and restrictions of access to protect public health and safety. This ARAR will be complied with through implementation of security measures (e.g., fences and institutional controls) during closure and postclosure. Security will be dependent on the postclosure land use.

ARAR 34 establishes requirements for final cover regarding the control of landfill gas migration and other factors. This ARAR will be complied with through inclusion of a landfill gas control system beneath the cap.

ARAR 35 establishes requirements for postclosure land use to protect the cover and gas monitoring systems and prevent public contact with the waste. This ARAR will be complied with in the design and maintenance of the cap, and through implementation of institutional controls such as restrictive environmental easements as discussed in Section 5.1.2.

ARARs 37 and 45 establish requirements for the slope stability of the final cover. The substantive requirements of the ARARs will be complied with by designing and constructing cover slopes that will be stable under both static and dynamic (i.e., earthquake) conditions.

ARAR 38 requires implementation and maintenance of a landfill gas control and leachate contact prevention system. This ARAR will be complied with through the design, construction and implementation of the gas control system beneath the cap and the reservoir LCPs.

ARAR 39 establishes requirements for a leachate collection and removal system. This ARAR will be complied with through the design, construction and implementation of the reservoir LCPs.

ARAR 41 establishes requirements for containment structures including their design and construction. This ARAR will be complied with through the construction of subsurface barriers, if needed.

ARAR 42 establishes requirements for vadose zone monitoring for waste constituents. This ARAR will be complied with through vadose zone monitoring and soil gas monitoring programs.

ARARs 43, 44 and 46 establish requirements for design, construction, and maintenance of cover, maintenance and monitoring programs, leachate collection and removal, ground water monitoring, leak detection, and gas control and treatment. These ARARs will be complied with through the O&M of the cap and other control and monitoring systems.

7.3.4.1.9 Action Specific - Water Quality

1. ARARs 47 and 48 establish requirements for ground water monitoring. The portions of ARARs 47 and 48 applicable to landfill closure will be met through the Alternative 4 ground water monitoring program. ARARs 49 and 50 establish state policy on treatment levels and maintenance of high water quality for beneficial use by the public. ARARs 49 and 50 will be complied with through the employment of stormwater run-off protection and other engineering control measures that protect water resources. ARAR 50A is applicable to ground water reinjection. ARAR 50A is not germane with respect to Alternative 4 since this alternative does not involve ground water extraction or treatment.

7.3.4.1.10 Action Specific - Air Quality

1. ARARs 51-62 are SCAQMD rules designed to regulate construction and other remediation activities to protect local air quality. These ARARs will be complied with through engineering controls during construction. Use of emulsified asphalt is not proposed in Alternative 4; therefore, ARAR 60 is not germane to this alternative.

7.3.4.1.11 To Be Considered

ARAR 63 establishes PRGs which are risk based concentrations evaluated and established at a 1 x 10^{-6} target level for carcinogens and at a Hazard Index of less than or equal to 1 for noncarcinogens. Soil PRGs can be considered as a soil cleanup standard when no promulgated standard exists. PRGs were used during the initial soil characterization at the Site. The EPA is going to determine if these requirements will continue to be applicable or relevant and appropriate for this Site.

ARAR 64 establishes provisional site-specific soil gas standards, which have been used for characterizing in-business air and soil gas. EPA will determine if this ARAR will remain applicable or relevant and appropriate for this Site.

ARAR 65 establishes that consolidation and in-situ treatment of hazardous waste within an area of contamination does not trigger land disposal restrictions or minimum technology requirements. This ARAR is compliant to Alternative 4 since it includes waste excavation.

ARAR 66 provides guidelines for design of multilayer covers including specific design requirements. These guidelines will be considered during design and construction of the RCRA-equivalent cap.

7.3.4.2 Conclusions

1. Section 7.3.4 and Table 7.4 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 4. As discussed in Section 7.3.4 and Table 7.4, ARARs 2-4, 50A and 60 are designated "Not Germane" since this alternative does not contain a ground water treatment program or the use of emulsified asphalt. Except for the ARARs that have been designated not germane, the remaining ARARs will be complied with in Alternative 4.

TABLE 7.4

COMPARISON OF ALTERNATIVE 4 AND ARARS WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
Chemical Specific - Water Quality								
1	1a. CWA - Title 33 USC /1251-1387.	x			x			
	1b. NPDES - Title 40 CFR Part 122.	x			x			
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x			x			
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x			x			
2	2a. SDWA - Title 42 USC /300f-300j-26.		x				x	Ground water remediation not included.
	2b. California Safe Drinking Water Act - California Health and Safety Code /116270-116751.		x				x	
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x				x	
	2d. Primary Drinking Water Quality Standards - Title 22 CCR, Ch. 15, /64431 and /64444.		x				x	
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - /13170 and /13241.	x					x	Ground water remediation not included.
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x					x	
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x				x	Ground water remediation not included.
Chemical Specific - Air Quality								
5	5a. CAA - Title 42 USC /7401 et seq.	x			x			
	5b. NAAQS - Title 40 CFR /50.1-50.11.	x			x			
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, /70101 and /70200.	x			x			

TABLE 7.4

COMPARISON OF ALTERNATIVE 4 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
6	6a. CAA - Title 42 USC /7401 et seq.		x		x			
	6b. NESHAPs - Title 40 CFR Part 61.		x		x			
	6c. SCAQMD Regulation X - Adopting Federal Standards.		x		x			
7	7a. CAA - Title 42 USC /7401 et seq.		x		x			
	7b. NSPSs -Title 40 CFR Part 60.		x		x			
	7c. SCAQMD Regulation IX - Adopting Federal Standards.		x		x			
8	8a. ARA - California Health and Safety Code /39000 et seq.	x			x			
	8b. California SIP.	x			x			
Chemical Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x			x			
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x			x			
10	10a. RCRA - Title 42 USC /6901 et seq.	x			x			
	10b. HWCA - California Health and Safety Code, Div. 20, Ch. 6.5 /25100 et seq.	x			x			
	10c. Criteria for Identifying Hazardous Wastes - Title 22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x			x			
Chemical Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x		x			
Location Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x			x			

TABLE 7.4

COMPARISON OF ALTERNATIVE 4 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
13	13a. ESA - Title 16 USC ⁄1531-1534.	x			x			
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x			x			
	13c. Environmental Protection Agency - Title 40 CFR˚⁄6.302(h).	x			x			
	13d. California Endangered Species Act - California Fish and Game Code ⁄2050-2098.	x			x			
Location Specific - Land Use								
14	14a. AHPA - Title 16 USC ⁄469 et seq.	x			x			
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x			x			
15	15a. Postclosure Land Use - Title 27 CCR ⁄21190.		x		x			
Action Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR ⁄66264.170-62264.178.		x		x			
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch.˚12, ⁄66262.10-66262.89.	x			x			
18	18a. Land Disposal Requirements - Title 22 CCR, Div.˚4.5, Ch. 18, ⁄66268.1, et seq. (onsite and offsite disposal).	x			x			
19	19a. Transportable and Fixed Treatment Units - Title˚22 CCR, Div. 4.5, Ch. 45, ⁄67450.3.	x			x			

TABLE 7.4

COMPARISON OF ALTERNATIVE 4 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
	Action Specific - Landfill Closure							
20	20a. RCRA - Closure and Postclosure for Landfill Closures - Title 22 CCR /66264.111-66246.120.		x		x			
21	21a. CAMU - Title 22 CCR /66264.552 and /66264.553.		x		x			
22	22a. SWMA - Title 27 CCR /20919.		x		x			
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR /20921.		x		x			
24	24a. Monitoring during Closure and Postclosure Title'27 CCR /20923.		x		x			
25	25a. Perimeter Monitoring during Closure and Postclosure - Title 27 CCR /20925.		x		x			
26	26a. Structure Monitoring during Closure and Postclosure - Title 27 CCR /20931.		x		x			
27	27a. Monitoring parameters during Closure and Postclosure - Title 27 CCR /20932.		x		x			
28	28a. Monitoring frequency during Closure and Postclosure - Title 27 CCR /20933.		x		x			
29	29a. Landfill Gas Control - Title 27 CCR /20937.		x		x			
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR /20800.		x		x			
31	31a. Drainage and Erosion Control - Title 27 CCR'/21150.	x			x			
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR /20650.		x		x			
33	33a. Security at Closed Sites - Title 27 CCR /21135.		x		x			
34	34a. Final Cover Standards - Title 27 CCR /21140.	x			x			
35	35a. Postclosure Land Use - Title 27 CCR /21190.		x		x			

TABLE 7.4

COMPARISON OF ALTERNATIVE 4 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
36	36a. Final Grade - Title 27 CCR /21142.	x			X			
37	37a. Slope Stability (Final Site Face) - Title 27 CCR°/21145.	x			x			
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR /21160.	x			x			
39	39a. Leachate Collection and Removal Systems - Title°27 CCR /20340.		x		x			
40	40a. Precipitation and Drainage Controls - Title 27 CCR /20365.		x		x			
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR /20310(d), /20320 and /20360.		x		x			
42	42a. Vadose Zone Monitoring - Title 27 CCR°/20415(d).		x		x			
43	43a. Postclosure Care and Use of Property - Title 27 CCR /21180.	x			x			
44	44a. Closure and Postclosure Care - Title 22 CCR°/66264.310.		x		x			
45	45a. Seismic Design Standards - Title 22 CCR°/66264.25(b).		x		x			
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR /21090.	x			x			
Action Specific - Water Quality								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch.°14, Art. 6, /66264.95-66264.99.		x		x			Monitoring only
48	48a. Ground Water Monitoring - Title 27 CCR°/20405, /20415-20430.		x		x			Monitoring only

TABLE 7.4

COMPARISON OF ALTERNATIVE 4 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
	49a. SWRCB - Porter-Cologne Water Quality Control Act - /13000, /13140 and /13240.	x			x			
49	49b. SWRCB Resolution No. 88-63.	x			x			Ground water remediation not included.
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x			x			
50	50a. SWRCB Resolution No. 68-16.		x		x			Ground water remediation not included.
50A	50A. SDWA - Title 40 CFR/300f, et seq.; 40 CFR Part 144 /3020.						x	Ground water remediation not included.
Action Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, /39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x			x			
52	52a. Nuisance - Rule 402.	x			x			
53	53a. Fugitive Dust - Rule 403.	x			x			
54	54a. Particulate Matter (Concentration) - Rule 404.	x			x			
55	55a. Solid Particulate Matter - Rule 405.	x			x			
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x			x			
57	57a. Circumvention - Rule 408.	x			x			
58	58a. Combustion - Rule 409.	x			x			
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x			x			
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	Emulsified asphalt will not be used.
61	61a. Excavation of Landfill Site - Rule 1150.		x		x			
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x			x			

TABLE 7.4

COMPARISON OF ALTERNATIVE 4 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	COMMENTS
To Be Considered Criteria								
63	63a. USEPA Region IX Preliminary Remediation Goals.			x	x			
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x	x			
65	65a. Use of Area of Contamination Concept during RCRA cleanups: Memo March 13, 1996.			x	x			
	65b. NCP Title 55 FR pages 8758-8760 (March 8, 1990).			x	x			
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x			x			

94-256/Reports/SFS Rev. 2.0 (7/25/00/rm)

(1) ARAR is not germane to Alternative 4 because activities regulated are not part of Alternative 4, but may apply to other alternatives.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.3.5 ALTERNATIVE 5

7.3.5.1 Alternative 5 Evaluation

1. The ARARs were individually reviewed to evaluate whether they were applicable, relevant and appropriate or not germane to this alternative. The alternative was then analyzed for its compliance with the ARARs. This evaluation is summarized in Table 7.5 and is discussed below. Several ARARs, although generally applicable or relevant and appropriate to Remedial Actions, are not germane since the activities regulated by such ARARs are not part of Alternative 5 (ARARs 2-4, 50A, 58, 59 and 60) and are designated "Not Germane to this Alternative." The ARAR numbers used herein are the same as those in Table 7.5.

7.3.5.1.1 Chemical Specific - Water Quality

1. ARAR 1 establishes requirements for industrial and construction activities to assure that potential stormwater discharges do not violate surface water quality standards. These requirements would apply to landfill cover drainage control, surface water discharge and run-off, and construction activities associated with Alternative 5. The substantive, not the administrative (i.e., permitting) requirements of this ARAR would apply. Compliance with these requirements will be achieved by engineering and institutional controls to minimize or eliminate pollutants in stormwater discharges and monitoring to demonstrate compliance.

2. ARARs 2-4 establish permissible contaminant concentration levels and/or water quality cleanup objectives, which are applicable to ground water and/or surface waters. Construction and O&M activities associated with Alternative 5 will be monitored to determine compliance with these levels and cleanup objectives. Ground water Remedial Actions other than monitoring are not included in Alternative 5; hence, these ARARs are not germane to this alternative.

7.3.5.1.2 Chemical Specific - Air Quality

1. ARARs 5-7 establish certain air quality or emission standards (NAAQS, NESHAPs, and NSPS). ARAR 8 is the California SIP which describes how air quality programs will be implemented. These ARARs apply to soil and landfill gas. The soil gas engineering controls, including the gas collection system beneath the RCRA-equivalent cap over the reservoir, and equipment, will be designed to meet these air quality and emissions standards during construction and O&M of Alternative 5 activities. Alternative 5 does not anticipate using flares or other thermal systems to treat extracted gas. New Source Review regulations would not be triggered by Alternative 5.

7.3.5.1.3 Chemical Specific - Waste Delineation And Management

1. ARAR 9 establishes requirements for storage and disposal of PCBs. ARAR 10 establishes criteria and methods for characterizing hazardous waste. The reservoir liquids extracted from the reservoir LCPs, as well as other wastes generated as part of Alternative 5, will be characterized, stored, treated and disposed in accordance with the requirements of these ARARs.

2. The LCPs will be monitored and if leachate is found it will be collected and analyzed. If the leachate is found to be hazardous, it will be managed, packaged, transported and disposed in accordance with these ARARs.

7.3.5.1.4 Chemical Specific - Landfill Gases

1. ARAR 11 requires control of the methane concentration in landfill gas. The soil gas engineering controls will be designed to meet these standards and monitoring will be implemented to assure compliance.

7.3.5.1.5 Location Specific - Migratory Birds And Endangered Species

1. ARARs 12 and 13 protect migratory birds and endangered or threatened species and their habitat, respectively, at hazardous waste sites. Migratory birds and endangered or threatened species or habitat have not been identified at the Site, hence these location-specific ARARs would be met by this alternative. If migratory birds and endangered or threatened species are encountered at the Site during remediation, the procedures of these ARARs for protection of the birds, endangered or threatened species, or habitat will be followed.

7.3.5.1.6 Location Specific - Land Use

1. ARAR 14 requires recovery and preservation of archaeological and historical artifacts. Such artifacts have not been identified at the Site, but if they are discovered during Alternative 5 remediation activity, the substantive requirements of this ARAR will be followed. ARAR 15 provides for postclosure design and construction requirements for buildings on the Site and within 1,000 feet of the waste holding area. These requirements will be met through the use of engineering and institutional controls. (Discussed in more detail below at ARAR 35 and in Section 5.1.2.)

7.3.5.1.7 Action Specific - Waste Management

1. ARARs 16 and 17 establish standards for the onsite management and documentation of hazardous wastes. ARAR 18 prohibits land disposal of contaminated wastes and establishes concentration limits and treatment criteria for such disposal. ARAR 19 establishes requirements for transportable and fixed SVE treatment units. Engineering controls will be implemented to assure that reservoir liquids extracted from the LCPs would be managed in accordance with ARARs 16 and 17. ARAR 18 is applicable as leachate will be extracted from the reservoir as part of Alternative 5. Reservoir liquids including oil, PCBs and water will be disposed offsite in accordance with applicable regulations. To the extent that transportable or fixed treatment units are used in the remediation, soil gas engineering controls will be designed to meet the ARAR 19 requirements.

7.3.5.1.8 Action Specific - Landfill Closure

1. ARARs 20-46 are requirements for landfill closures. Certain landfill closure requirements applicable to landfill cap design, construction and monitoring would be applicable or relevant and appropriate to Alternative 5 since it involves construction of an RCRA-equivalent cap over the reservoir. This alternative complies with landfill closure and postclosure requirements. The approach that will be followed to comply with these ARARs is described below:

   ARAR 20 establishes closure requirements for landfills. These requirements will be achieved through the design and construction of a RCRA-equivalent cap.

   ARAR 21 establishes that consolidation of remediation wastes generated as part of a corrective action and placement into a corrective action management unit does not constitute placement or land disposal of hazardous waste. This ARAR will be complied with during excavation and consolidation of the wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2.

   ARAR 22 requires monitoring and gas control when landfill gas may present a hazard or nuisance. This is achieved in Alternative 5 by inclusion of a gas control system beneath the cap and gas control measures that will be implemented as needed. The substantive requirements of the ARAR will be achieved during design and construction of the cap.

   ARAR 23 establishes requirements for control of trace gases to prevent exposure. It also requires closure and postclosure activities to continue for 30 years, and that modification of systems be made to reflect changing land uses. The substantive requirements of the ARAR will be achieved during design and construction of the cap and through implementation of institutional controls as discussed in Section 5.1.2.

ARAR 24 establishes specific requirements for landfill gas monitoring systems, including adjacent land use and inhabitable structures within 1,000 feet of disposal site and property boundary. This ARAR will be complied with through measures included in the Site monitoring plan.

ARAR 25 establishes requirements for a landfill gas monitoring network around the waste deposit perimeter Site boundary. This ARAR will be met through implementation of the perimeter gas control monitoring program.

ARAR 26 establishes requirements for gas monitoring inside buildings and onsite structures. This ARAR will be complied with through an in-business air monitoring program.

ARAR 27 establishes requirements for sampling of monitoring probes and onsite structures for landfill gas. This ARAR will be complied with through the Site monitoring program, which includes collection and analysis of samples for methane and VOCs.

ARAR 28 establishes requirements for quarterly monitoring, or more frequent if gas migration or other factors are met. This ARAR will be complied with through the Site monitoring program.

ARAR 29 establishes specific requirements for the gas control system design, construction and monitoring to prevent methane accumulation and reduce methane levels to below compliance at the property boundary. This ARAR will be complied with through the design and operation of the gas control system.

ARAR 30 establishes requirements to minimize dust during construction and maintenance of the landfill cover. The substantive requirements of the ARAR will be achieved through dust control measures, such as water sprays, taken during construction and maintenance of the cover.

ARAR 31 establishes requirements for drainage and erosion control systems and monitoring of these systems so as to prevent contact with waste. The substantive requirements of the ARAR will be achieved during design and postclosure maintenance of the cover and drainage systems.

ARARs 32, 36 and 40 establish grading requirements of the disposal area to promote lateral run-off of precipitation and to prevent ponding. The substantive requirements of the ARARs will be achieved through design and postclosure maintenance of the cover and drainage systems. Specifically the cap will be designed and built with minimum grades recommended in EPA guidance documents.

ARAR 33 establishes requirements for Site security and restrictions of access to protect public health and safety. This ARAR will be complied with through implementation of security measures (e.g., fences and institutional controls) during closure and postclosure. Security will be dependent on the postclosure land use.

ARAR 34 establishes requirements for final cover regarding the control of landfill gas migration and other factors. This ARAR will be complied with through inclusion of a landfill gas control system beneath the cap.

ARAR 35 establishes requirements for postclosure land use to protect the cover and gas monitoring systems and prevent public contact with the waste. This ARAR will be complied with in the design and maintenance of the cap, and through implementation of institutional controls such as restrictive environmental easements as discussed in Section 5.1.2.

ARARs 37 and 45 establish requirements for the slope stability of the final cover. The substantive requirements of the ARARs will be complied with by designing and constructing cover slopes that will be stable under both static and dynamic (i.e., earthquake) conditions.

ARAR 38 requires implementation and maintenance of a landfill gas control and leachate contact prevention system. This ARAR will be complied with through the design, construction and implementation of the gas control system beneath the cap and the reservoir LCPs.

ARAR 39 establishes requirements for a leachate collection and removal system. This ARAR will be complied with through the design, construction and implementation of the reservoir LCPs.

ARAR 41 establishes requirements for containment structures including their design and construction. This ARAR will be complied with through the construction of subsurface barriers, if needed.

ARAR 42 establishes requirements for vadose zone monitoring for waste constituents. This ARAR will be complied with through vadose zone monitoring and soil gas monitoring programs.

ARARs 43, 44 and 46 establish requirements for design, construction, and maintenance of cover, maintenance and monitoring programs, leachate collection and removal, ground water monitoring, leak detection, and gas control and treatment. These ARARs will be complied with through the O&M of the cap and other control and monitoring systems.

7.3.5.1.9 Action Specific - Water Quality

1. ARARs 47 and 48 establish requirements for ground water monitoring. The portions of ARARs 47 and 48 applicable to landfill closure will be met through the Alternative 5 ground water monitoring program. ARARs 49 and 50 establish state policy on treatment levels and maintenance of high water quality for beneficial use by the public. ARARs 49 and 50 will be complied with through the employment of stormwater run-off protection and other engineering control measures that protect water resources. ARAR 50A is applicable to ground water reinjection. ARAR 50A is not germane with respect to Alternative 5 since this alternative does not involve ground water extraction or treatment.

7.3.5.1.10 Action Specific - Air Quality

1. ARARs 51-57 are SCAQMD rules designed to regulate construction and other remediation activities to protect local air quality. These ARARs will be complied with through engineering

controls during construction. ARARs 58 through 60 regulate activities such as the use of SVE units and use of emulsified asphalt. None of which are proposed in Alternative 5; therefore, they are not germane to this alternative. ARARs 61 and 62 regulate activities associated with onsite excavation and will be complied with.

7.3.5.1.11 To Be Considered

ARAR 63 establishes PRGs which are risk based concentrations evaluated and established at a 1×10^{-6} target level for carcinogens and at a Hazard Index of less than or equal to 1 for noncarcinogens. Soil PRGs can be considered as a soil cleanup standard when no promulgated standard exists. PRGs were used during the initial soil characterization at the Site. The EPA is going to determine if these requirements will continue to be applicable or relevant and appropriate for this Site.

ARAR 64 establishes provisional site-specific soil gas standards, which have been used for characterizing in-business air and soil gas. EPA will determine if this ARAR will remain applicable or relevant and appropriate for this Site.

ARAR 65 establishes that consolidation and in-situ treatment of hazardous waste within an area of contamination does not trigger land disposal restrictions or minimum technology requirements. This ARAR is compliant to Alternative 5 since it includes waste excavation.

ARAR 66 provides guidelines for design of multilayer covers including specific design requirements. These guidelines will be considered during design and construction of the RCRA-equivalent cap.

7.3.5.2 Conclusions

1. Section 7.3.5 and Table 7.5 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 5. As discussed in Section 7.3.5 and Table 7.5, ARARs 2-4, 50A, 58, 59 and 60 are designated "Not Germane" since this alternative does not contain a ground water treatment program or the use of emulsified asphalt. Except for the ARARs that have been designated not germane, the remaining ARARs will be complied with in Alternative 5.

TABLE 7.5

COMPARISON OF ALTERNATIVE 5 AND ARARS
WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
Chemical Specific - Water Quality								
1	1a. CWA - Title 33 USC/1251-1387.	x			x			
	1b. NPDES - Title 40 CFR Part 122.	x			x			
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x			x			
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x			x			
2	2a. SDWA - Title 42 USC/300f-300j-26.		x				x	Ground water remediation not included.
	2b. California Safe Drinking Water Act - California Health and Safety Code /116270-116751.		x				x	
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x				x	
	2d. Primary Drinking Water Quality Standards - Title 22 CCR, Ch. 15, /64431 and /64444.		x				x	
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - /13170 and /13241.	x					x	Ground water remediation not included.
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x					x	
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x				x	Ground water remediation not included.
Chemical Specific - Air Quality								
5	5a. CAA - Title 42 USC/7401 et seq.	x			x			
	5b. NAAQS - Title 40 CFR/50.1-50.11.	x			x			
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, /70101 and /70200.	x			x			

TABLE 7.5

COMPARISON OF ALTERNATIVE 5 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
6	6a. CAA - Title 42 USC /7401 et seq.		x		x			
	6b. NESHAPs - Title 40 CFR Part 61.		x		x			
	6c. SCAQMD Regulation X - Adopting Federal Standards.		x		x			
7	7a. CAA - Title 42 USC /7401 et seq.		x		x			
	7b. NSPSs -Title 40 CFR Part 60.		x		x			
	7c. SCAQMD Regulation IX - Adopting Federal Standards.		x		x			
8	8a. ARA - California Health and Safety Code /39000 et seq.	x			x			
	8b. California SIP.	x			x			
Chemical Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x			x			
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x			x			
10	10a. RCRA - Title 42 USC /6901 et seq.	x			x			
	10b. HWCA - California Health and Safety Code, Div. 20, Ch. 6.5 /25100 et seq.	x			x			
	10c. Criteria for Identifying Hazardous Wastes - Title 22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x			x			
Chemical Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x		x			
Location Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x			x			

TABLE 7.5

COMPARISON OF ALTERNATIVE 5 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	COMMENTS
13	13a. ESA - Title 16 USC /1531-1534.	x			x			
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x			x			
	13c. Environmental Protection Agency - Title 40 CFR /6.302(h).	x			x			
	13d. California Endangered Species Act - California Fish and Game Code /2050-2098.	x			x			
Location Specific - Land Use								
14	14a. AHPA - Title 16 USC /469 et seq.	x			x			
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x			x			
15	15a. Postclosure Land Use - Title 27 CCR /21190.		x		x			
Action Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR /66264.170-62264.178.		x		x			
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch. 12, /66262.10-66262.89.	x			x			
18	18a. Land Disposal Requirements - Title 22 CCR, Div. 4.5, Ch. 18, /66268.1, et seq. (onsite and offsite disposal).	x			x			
19	19a. Transportable and Fixed Treatment Units - Title 22 CCR, Div. 4.5, Ch. 45, /67450.3.	x			x			

TABLE 7.5

COMPARISON OF ALTERNATIVE 5 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	COMMENTS
Action Specific - Landfill Closure								
20	20a. RCRA - Closure and Postclosure for Landfill Closures - Title 22 CCR /66264.111-66246.120.		x		x			
21	21a. CAMU - Title 22 CCR /66264.552 and /66264.553.		x		x			
22	22a. SWMA - Title 27 CCR /20919.		x		x			
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR /20921.		x		x			
24	24a. Monitoring during Closure and Postclosure Title 27 CCR /20923.		x		x			
25	25a. Perimeter Monitoring during Closure and Postclosure - Title 27 CCR /20925.		x		x			
26	26a. Structure Monitoring during Closure and Postclosure - Title 27 CCR /20931.		x		x			
27	27a. Monitoring parameters during Closure and Postclosure - Title 27 CCR /20932.		x		x			
28	28a. Monitoring frequency during Closure and Postclosure - Title 27 CCR /20933.		x		x			
29	29a. Landfill Gas Control - Title 27 CCR /20937.		x		x			
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR /20800.		x		x			
31	31a. Drainage and Erosion Control - Title 27 CCR /21150.	x			x			
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR /20650.		x		x			
33	33a. Security at Closed Sites - Title 27 CCR /21135.		x		x			
34	34a. Final Cover Standards - Title 27 CCR /21140.	x			x			
35	35a. Postclosure Land Use - Title 27 CCR /21190.		x		x			

TABLE 7.5

COMPARISON OF ALTERNATIVE 5 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
36	36a. Final Grade - Title 27 CCR /21142.	x			X			
37	37a. Slope Stability (Final Site Face) - Title 27 CCR°/21145.	x			x			
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR /21160.	x			x			
39	39a. Leachate Collection and Removal Systems - Title°27 CCR /20340.		x		x			
40	40a. Precipitation and Drainage Controls - Title 27 CCR /20365.		x		x			
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR°/20310(d), /20320 and /20360.		x		x			
42	42a. Vadose Zone Monitoring - Title 27 CCR°/20415(d).		x		x			
43	43a. Postclosure Care and Use of Property - Title 27 CCR /21180.	x			x			
44	44a. Closure and Postclosure Care - Title 22 CCR°/66264.310.		x		x			
45	45a. Seismic Design Standards - Title 22 CCR°/66264.25(b).		x		x			
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR /21090.	x			x			
Action Specific - Water Quality								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch.°14, Art. 6, /66264.95-66264.99.		x		x			Monitoring only.
48	48a. Ground Water Monitoring - Title 27 CCR°/20405, /20415-20430.		x		x			Monitoring only.

TABLE 7.5

COMPARISON OF ALTERNATIVE 5 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative[1]	
49	49a. SWRCB - Porter-Cologne Water Quality Control Act - /13000, /13140 and /13240.	x			x			
	49b. SWRCB Resolution No. 88-63.	x			x			Ground water remediation not included.
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x			x			
50	50a. SWRCB Resolution No. 68-16.		x		x			Ground water remediation not included.
50A	50A. SDWA - Title 40 CFR /300f, et seq.; 40 CFR Part 144 /3020.						x	Ground water remediation not included.
Action Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, /39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x			x			
52	52a. Nuisance - Rule 402.	x			x			
53	53a. Fugitive Dust - Rule 403.	x			x			
54	54a. Particulate Matter (Concentration) - Rule 404.	x			x			
55	55a. Solid Particulate Matter - Rule 405.	x			x			
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x			x			
57	57a. Circumvention - Rule 408.	x			x			
58	58a. Combustion - Rule 409.	x					x	SVE units are not part of this Alternative.
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x					x	SVE units are not part of this Alternative.
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	Emulsified asphalt will not be used.
61	61a. Excavation of Landfill Site - Rule 1150.		x		x			
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x			x			

TABLE 7.5

COMPARISON OF ALTERNATIVE 5 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
To Be Considered Criteria								
63	63a. USEPA Region IX Preliminary Remediation Goals.			x	x			
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x	x			
65	65a. Use of Area of Contamination Concept during RCRA cleanups: Memo March 13, 1996.			x	x			
	65b. NCP Title 55 FR pages 8758-8760 (March 8, 1990).			x	x			
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x			x			

94-256/Reports/SFS Rev. 2.0 (7/25/00/rm)

(1) ARAR is not germane to Alternative 5 because activities regulated are not part of Alternative 5, but may apply to other alternatives.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.3.6 ALTERNATIVE 6

7.3.6.1 Alternative 6 Evaluation

1. The ARARs were individually reviewed to evaluate whether they were applicable, relevant and appropriate or not germane to this alternative. The alternative was then analyzed for its compliance with the ARARs. This evaluation is summarized in Table 7.6 and is discussed below. Several ARARs, although generally applicable or relevant and appropriate to Remedial Actions, are not germane since the activities regulated by such ARARs are not part of Alternative 6 (ARARs 2-4, 50A, 58, 59 and 60) and are designated "Not Germane to this Alternative." The ARAR numbers used herein are the same as those in Table 7.6.

7.3.6.1.1 Chemical Specific - Water Quality

1. ARAR 1 establishes requirements for industrial and construction activities to assure that potential stormwater discharges do not violate surface water quality standards. These requirements would apply to landfill cover drainage control, surface water discharge and run-off, and construction activities associated with Alternative 6. The substantive, not the administrative (i.e., permitting) requirements of this ARAR would apply. Compliance with these requirements will be achieved by engineering and institutional controls to minimize or eliminate pollutants in stormwater discharges and monitoring to demonstrate compliance.

2. ARARs 2-4 establish permissible contaminant concentration levels and/or water quality cleanup objectives, which are applicable to ground water and/or surface waters. Construction and O&M activities associated with Alternative 6 will be monitored to determine compliance with these levels and cleanup objectives. Ground water Remedial Actions other than monitoring are not included in Alternative 6; hence, these ARARs are not germane to this alternative.

7.3.6.1.2 Chemical Specific - Air Quality

1. ARARs 5-7 establish certain air quality or emission standards (NAAQS, NESHAPs, and NSPS). ARAR 8 is the California SIP which describes how air quality programs will be implemented. These ARARs apply to soil and landfill gas. The soil gas engineering controls, including the gas collection system beneath the RCRA-equivalent cap over the reservoir, and equipment, will be designed to meet these air quality and emissions standards during

construction and O&M of Alternative 6 activities. Alternative 6 does not anticipate using flares or other thermal systems to treat extracted gas. New Source Review regulations would not be triggered by Alternative 6.

7.3.6.1.3 Chemical Specific - Waste Delineation And Management

1. ARAR 9 establishes requirements for storage and disposal of polychlorinated biphenols (PCBs) and ARAR 10 establishes criteria and methods for characterizing hazardous waste. The reservoir liquids extracted from the reservoir LCPs, as well as other wastes generated as part of Alternative 6, will be characterized, stored, treated and disposed in accordance with the requirements of these ARARs.

2. The LCPs will be monitored and if leachate is found it will be collected and analyzed. If the leachate is found to be hazardous will be managed, packaged, transported and disposed in accordance with these ARARs.

7.3.6.1.4 Chemical Specific - Landfill Gases

1. ARAR 11 requires control of the methane concentration in landfill gas. The soil gas engineering controls will be designed to meet these standards and monitoring will be implemented to assure compliance.

7.3.6.1.5 Location Specific - Migratory Birds And Endangered Species

1. ARARs 12 and 13 protect migratory birds and endangered or threatened species and their habitat, respectively, at hazardous waste sites. Migratory birds and endangered or threatened species and their habitat have not been identified at the Site, hence these location-specific ARARs would be met by this alternative. If migratory birds and endangered or threatened species are encountered at the Site during remediation, the procedures of these ARARs for protection of the birds, endangered or threatened species, or habitat will be followed.

7.3.6.1.6 Location Specific - Land Use

1. ARAR 14 requires recovery and preservation of archaeological and historical artifacts. Such artifacts have not been identified at the Site, but if they are discovered during Alternative 6 remediation activity, the substantive requirements of this ARAR will be followed.

ARAR 15 provides for postclosure design and construction requirements for buildings on the Site and within 1,000 feet of the waste holding area. These requirements will be met through the use of engineering and institutional controls. (Discussed in more detail below at ARAR 35 and in Section 5.1.2.)

7.3.6.1.7 Action Specific - Waste Management

1. ARARs 16 and 17 establish standards for the onsite management and documentation of hazardous wastes. ARAR 18 prohibits land disposal of contaminated wastes and establishes concentration limits and treatment criteria for such disposal. ARAR 19 establishes requirements for transportable and fixed SVE treatment units. Engineering controls will be implemented to assure that reservoir liquids extracted from the LCPs would be managed in accordance with ARARs 16 and 17. ARAR 18 is applicable as leachate will be extracted from the reservoir as part of Alternative 6. Reservoir liquids including oil, PCBs and water will be disposed offsite in accordance with applicable regulations. To the extent that transportable or fixed treatment units are used in the remediation, soil gas engineering controls will be designed to meet the ARAR 19 requirements.

7.3.6.1.8 Action Specific - Landfill Closure

1. ARARs 20-46 are requirements for landfill closures. Certain landfill closure requirements applicable to landfill cap design, construction and monitoring would be applicable or relevant and appropriate to Alternative 6 since it involves construction of an RCRA-equivalent cap over the reservoir. This alternative complies with landfill closure and postclosure requirements. The approach that will be followed to comply with these ARARs is described below:

   ARAR 20 establishes closure requirements for landfills. These requirements will be achieved through the design and construction of a RCRA-equivalent cap.

   ARAR 21 establishes that consolidation of remediation wastes generated as part of a corrective action and placement into a corrective action management unit does not constitute placement or land disposal of hazardous waste. This ARAR will be complied with during excavation and consolidation of wastes from Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2.

   ARAR 22 requires monitoring and gas control when landfill gas may present a hazard or nuisance. This is achieved in Alternative 6 by inclusion of a gas control system beneath the cap and gas control measures that will be implemented as needed. The substantive requirements of the ARAR will be achieved during design and construction of the cap.

ARAR 23 establishes requirements for control of trace gases to prevent exposure. It also requires closure and postclosure activities to continue for 30 years, and that modification of systems be made to reflect changing land uses. The substantive requirements of the ARAR will be achieved during design and construction of the cap and through implementation of institutional controls as discussed in Section 5.1.2.

ARAR 24 establishes specific requirements for landfill gas monitoring systems, including adjacent land use and inhabitable structures within 1,000 feet of disposal site and property boundary. This ARAR will be complied with through measures included in the Site monitoring plan.

ARAR 25 establishes requirements for a landfill gas monitoring network around the waste deposit perimeter Site boundary. This ARAR will be met through implementation of the perimeter gas control monitoring program.

ARAR 26 establishes requirements for gas monitoring inside buildings and onsite structures. This ARAR will be complied with through an in-business air monitoring program.

ARAR 27 establishes requirements for sampling of monitoring probes and onsite structures for landfill gas. This ARAR will be complied with through the Site monitoring program, which includes collection and analysis of samples for methane and VOCs.

ARAR 28 establishes requirements for quarterly monitoring, or more frequent if gas migration or other factors are met. This ARAR will be complied with through the Site monitoring program.

ARAR 29 establishes specific requirements for the gas control system design, construction and monitoring to prevent methane accumulation and reduce methane levels to below compliance at the property boundary. This ARAR will be complied with through the design and operation of the gas control system.

ARAR 30 establishes requirements to minimize dust during construction and maintenance of the landfill cover. The substantive requirements of the ARAR will be achieved through dust control measures, such as water sprays, taken during construction and maintenance of the cover.

ARAR 31 establishes requirements for drainage and erosion control systems and monitoring of these systems so as to prevent contact with waste. The substantive requirements of the ARAR will be achieved during design and postclosure maintenance of the cover and drainage systems.

ARARs 32, 36 and 40 establish grading requirements of the disposal area to promote lateral run-off of precipitation and to prevent ponding. The substantive requirements of the ARARs will be achieved through design and postclosure maintenance of the cover and drainage systems. Specifically the cap will be designed and built with minimum grades recommended in EPA guidance documents.

ARAR 33 establishes requirements for Site security and restrictions of access to protect public health and safety. This ARAR will be complied with through implementation of security measures (e.g., fences and institutional controls) during closure and postclosure. Security will be dependent on the postclosure land use.

ARAR 34 establishes requirements for final cover regarding the control of landfill gas migration and other factors. This ARAR will be complied with through inclusion of a landfill gas control system beneath the cap.

ARAR 35 establishes requirements for postclosure land use to protect the cover and gas monitoring systems and prevent public contact with the waste. This ARAR will be complied with in the design and maintenance of the cap, and through implementation of institutional controls such as restrictive environmental easements as discussed in Section 5.1.2.

ARARs 37 and 45 establish requirements for the slope stability of the final cover. The substantive requirements of the ARARs will be complied with by designing and constructing cover slopes that will be stable under both static and dynamic (i.e., earthquake) conditions.

ARAR 38 requires implementation and maintenance of a landfill gas control and leachate contact prevention system. This ARAR will be complied with through the design, construction and implementation of the gas control system beneath the cap and the reservoir LCPs.

ARAR 39 establishes requirements for a leachate collection and removal system. This ARAR will be complied with through the design, construction and implementation of the reservoir LCPs.

ARAR 41 establishes requirements for containment structures including their design and construction. This ARAR will be complied with through the construction of subsurface barriers, if needed.

ARAR 42 establishes requirements for vadose zone monitoring for waste constituents. This ARAR will be complied with through vadose zone monitoring and soil gas monitoring programs.

ARARs 43, 44 and 46 establish requirements for design, construction, and maintenance of cover, maintenance and monitoring programs, leachate collection and removal, ground water monitoring, leak detection, and gas control and treatment. These ARARs will be complied with through the O&M of the cap and other control and monitoring systems.

7.3.6.1.9 Action Specific - Water Quality

1. ARARs 47 and 48 establish requirements for ground water monitoring. The portions of ARARs 47 and 48 applicable to landfill closure will be met through the Alternative 6 ground water monitoring program. ARARs 49 and 50 establish state policy on treatment levels and maintenance of high water quality for beneficial use by the public. ARARs 49 and 50 will be complied with through the employment of stormwater run-off protection and other engineering control measures that protect water resources. ARAR 50A is applicable to ground water reinjection. ARAR 50A is not germane with respect to Alternative 6 since this alternative does not involve ground water extraction or treatment.

7.3.6.1.10 Action Specific - Air Quality

1. ARARs 51-57 are SCAQMD rules designed to regulate construction and other remediation activities to protect local air quality. These ARARs will be complied with through engineering controls during construction. ARARs 58-60 regulate activities such as the use of SVE units and use of emulsified asphalt. None of which are proposed in Alternative 6; therefore, they are not germane to this alternative. ARARs 61 and 62 regulate activities associated with onsite excavation and will be complied with.

7.3.6.1.11 To Be Considered

ARAR 63 establishes PRGs which are risk based concentrations evaluated and established at a 1 x 10^{-6} target level for carcinogens and at a Hazard Index of less than or equal to 1 for noncarcinogens. Soil PRGs can be considered as a soil cleanup standard when no promulgated standard exists. PRGs were used during the initial soil characterization at the Site. The EPA is going to determine if these requirements will continue to be applicable or relevant and appropriate for this Site.

ARAR 64 establishes provisional site-specific soil gas standards, which have been used for characterizing in-business air and soil gas. EPA will determine if this ARAR will remain applicable or relevant and appropriate for this Site.

ARAR 65 establishes that consolidation and in-situ treatment of hazardous waste within an area of contamination does not trigger land disposal restrictions or minimum technology requirements. This ARAR is compliant to Alternative 6 since it includes waste excavation.

ARAR 66 provides guidelines for design of multilayer covers including specific design requirements. These guidelines will be considered during design and construction of the RCRA-equivalent cap.

7.3.6.2 <u>Conclusions</u>

1. Section 7.3.6 and Table 7.6 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 6. As discussed in Section 7.3.6 and Table 7.6, ARARs 2-4, 50A, 58, 59 and 60 are designated "Not Germane" since this alternative does not contain a ground water treatment program or the use of emulsified asphalt. Except for the ARARs that have been designated not germane, the remaining ARARs will be complied with in Alternative 6.

TABLE 7.6

COMPARISON OF ALTERNATIVE 6 AND ARARS
WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
Chemical Specific - Water Quality								
1	1a. CWA - Title 33 USC /1251-1387.	x			x			
	1b. NPDES - Title 40 CFR Part 122.	x			x			
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x			x			
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x			x			
2	2a. SDWA - Title 42 USC /300f-300j-26.		x				x	Ground water remediation not included.
	2b. California Safe Drinking Water Act - California Health and Safety Code /116270-116751.		x				x	
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x				x	
	2d. Primary Drinking Water Quality Standards - Title 22 CCR, Ch. 15, /64431 and /64444.		x				x	
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - /13170 and /13241.	x					x	Ground water remediation not included.
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x					x	
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x				x	Ground water remediation not included.
Chemical Specific - Air Quality								
5	5a. CAA - Title 42 USC /7401 et seq.	x			x			
	5b. NAAQS - Title 40 CFR /50.1-50.11.	x			x			
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, /70101 and /70200.	x			x			

TRC
Customer-Focused Solutions

TABLE 7.6

COMPARISON OF ALTERNATIVE 6 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
6	6a. CAA - Title 42 USC /7401 et seq.		x		x			
	6b. NESHAPs - Title 40 CFR Part 61.		x		x			
	6c. SCAQMD Regulation X - Adopting Federal Standards.		x		x			
7	7a. CAA - Title 42 USC /7401 et seq.		x		x			
	7b. NSPSs -Title 40 CFR Part 60.		x		x			
	7c. SCAQMD Regulation IX - Adopting Federal Standards.		x		x			
8	8a. ARA - California Health and Safety Code /39000 et seq.	x			x			
	8b. California SIP.	x			x			
Chemical Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x			x			
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x			x			
10	10a. RCRA - Title 42 USC /6901 et seq.	x			x			
	10b. HWCA - California Health and Safety Code, Div. 20, Ch. 6.5 /25100 et seq.	x			x			
	10c. Criteria for Identifying Hazardous Wastes - Title 22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x			x			
Chemical Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x		x			
Location Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x			x			

TRC
Customer-Focused Solutions

TABLE 7.6

COMPARISON OF ALTERNATIVE 6 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	ANALYSIS: Relevant and Appropriate	ANALYSIS: To Be Considered	ANALYSIS: Complies	ANALYSIS: Does Not Comply	ANALYSIS: Not Germane to this Alternative[1]	COMMENTS
13	13a. ESA - Title 16 USC /1531-1534.	x			x			
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x			x			
	13c. Environmental Protection Agency - Title 40 CFR°/6.302(h).	x			x			
	13d. California Endangered Species Act - California Fish and Game Code /2050-2098.	x			x			
Location Specific - Land Use								
14	14a. AHPA - Title 16 USC /469 et seq.	x			x			
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x			x			
15	15a. Postclosure Land Use - Title 27 CCR /21190.		x		x			
Action Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR /66264.170-62264.178.		x		x			
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch.°12, /66262.10-66262.89.	x			x			
18	18a. Land Disposal Requirements - Title 22 CCR, Div.°4.5, Ch. 18, /66268.1, et seq. (onsite and offsite disposal).	x			x			
19	19a. Transportable and Fixed Treatment Units - Title°22 CCR, Div. 4.5, Ch. 45, /67450.3.	x			x			

TABLE 7.6

COMPARISON OF ALTERNATIVE 6 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
Action Specific - Landfill Closure								
20	20a. RCRA - Closure and Postclosure for Landfill Closures - Title 22 CCR /66264.111-66246.120.		x		x			
21	21a. CAMU - Title 22 CCR /66264.552 and /66264.553.		x		x			
22	22a. SWMA - Title 27 CCR /20919.		x		x			
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR /20921.		x		x			
24	24a. Monitoring during Closure and Postclosure Title°27 CCR /20923.		x		x			
25	25a. Perimeter Monitoring during Closure and Postclosure - Title 27 CCR /20925.		x		x			
26	26a. Structure Monitoring during Closure and Postclosure - Title 27 CCR /20931.		x		x			
27	27a. Monitoring parameters during Closure and Postclosure - Title 27 CCR /20932.		x		x			
28	28a. Monitoring frequency during Closure and Postclosure - Title 27 CCR /20933.		x		x			
29	29a. Landfill Gas Control - Title 27 CCR /20937.		x		x			
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR /20800.		x		x			
31	31a. Drainage and Erosion Control - Title 27 CCR°/21150.	x			x			
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR /20650.		x		x			
33	33a. Security at Closed Sites - Title 27 CCR /21135.		x		x			
34	34a. Final Cover Standards - Title 27 CCR /21140.	x			x			
35	35a. Postclosure Land Use - Title 27 CCR /21190.		x		x			

TABLE 7.6

COMPARISON OF ALTERNATIVE 6 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
36	36a. Final Grade - Title 27 CCR /21142.	x			X			
37	37a. Slope Stability (Final Site Face) - Title 27 CCR°/21145.	x			x			
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR /21160.	x			x			
39	39a. Leachate Collection and Removal Systems - Title°27 CCR /20340.		x		x			
40	40a. Precipitation and Drainage Controls - Title 27 CCR /20365.		x		x			
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR°/20310(d), /20320 and /20360.		x		x			
42	42a. Vadose Zone Monitoring - Title 27 CCR°/20415(d).		x		x			
43	43a. Postclosure Care and Use of Property - Title 27 CCR /21180.	x			x			
44	44a. Closure and Postclosure Care - Title 22 CCR°/66264.310.		x		x			
45	45a. Seismic Design Standards - Title 22 CCR°/66264.25(b).		x		x			
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR /21090.	x			x			
Action Specific - Water Quality								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch.°14, Art. 6, /66264.95-66264.99.		x		x			Monitoring only.
48	48a. Ground Water Monitoring - Title 27 CCR°/20405, /20415-20430.		x		x			Monitoring only.

TRC
CustomerFocused Solutions

TABLE 7.6

COMPARISON OF ALTERNATIVE 6 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
49	49a. SWRCB - Porter-Cologne Water Quality Control Act - /13000, /13140 and /13240.	x			x			
	49b. SWRCB Resolution No. 88-63.	x			x			Ground water remediation not included.
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x			x			
50	50a. SWRCB Resolution No. 68-16.		x		x			Ground water remediation not included.
50A	50A. SDWA - Title 40 CFR /300f, et seq.; 40 CFR°Part°144 /3020.						x	Ground water remediation not included.
Action Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, /39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x			x			
52	52a. Nuisance - Rule 402.	x			x			
53	53a. Fugitive Dust - Rule 403.	x			x			
54	54a. Particulate Matter (Concentration) - Rule 404.	x			x			
55	55a. Solid Particulate Matter - Rule 405.	x			x			
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x			x			
57	57a. Circumvention - Rule 408.	x			x			
58	58a. Combustion - Rule 409.	x					x	SVE units are not part of this Alternative.
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x					x	SVE units are not part of this Alternative.
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	Emulsified asphalt will not be used.
61	61a. Excavation of Landfill Site - Rule 1150.		x		x			
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x			x			

TRC
Customer-Focused Solutions

TABLE 7.6

COMPARISON OF ALTERNATIVE 6 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
	To Be Considered Criteria							
63	63a. USEPA Region IX Preliminary Remediation Goals.			x	x			
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x	x			
65	65a. Use of Area of Contamination Concept during RCRA cleanups: Memo March 13, 1996.			x	x			
	65b. NCP Title 55 FR pages 8758-8760 (March 8, 1990).			x	x			
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x			x			

94-256/Reports/SFS Rev. 2.0 (7/25/00/rm)

(1) ARAR is not germane to Alternative 6 because activities regulated are not part of Alternative 6, but may apply to other alternatives.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.3.7 ALTERNATIVE 7

7.3.7.1 Alternative 7 Evaluation

1. The ARARs were individually reviewed to evaluate whether they were applicable, relevant and appropriate or not germane to this alternative. The alternative was then analyzed for its compliance with the ARARs. This evaluation is summarized in Table 7.7 and discussed below. Alternative 7 consists only of ground water monitoring, and is considered a remedial technology.

2. The ARARs germane to this alternative include ARARs 2-4, 47 and 48. Alternative 7 will not comply with ARARs 2-4 as it provides only for the ground water monitoring portion and does not include treatment. The present ground water monitoring program in place at the Site complies with ARARs 47 and 48 and will be continued after closure. The remaining ARARs are not germane to Alternative 7 as this alternative does not include Remedial Actions to comply with the regulations.

7.3.7.2 Conclusions

1. Ground water monitoring as a separate alternative will not comply with all of the germane ARARs.

TABLE 7.7

COMPARISON OF ALTERNATIVE 7 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	COMMENTS
Chemical-Specific - Water Quality(2)								
1	1a. CWA- Title 33 USC /1251-1387.	x					x	
	1b. NPDES - Title 40 CFR Part 122.	x					x	
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x					x	
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x					x	
2	2a. SDWA - Title 42 USC /300f-300j-26.		x			x		Ground water remediatio not included.
	2b. California Safe Drinking Water Act - California Health and Safety Code /116270-116751.		x			x		
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x			x		
	2d. Primary Drinking Water Quality Standards - Title°22 CCR, Ch. 15, /64431 and /64444.		x			x		
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - /13170 and /13241.	x				x		Ground water remediatio not included.
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x				x		
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x			x		Ground water remediatio not included.
Chemical-Specific - Air Quality								
5	5a. CAA - Title 42 USC /7401 et seq.	x					x	
	5b. NAAQS - Title 40 CFR /50.1-50.11.	x					x	
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, /70101 and°/70200.	x					x	

TRC
Customer-Focused Solutions

(　　　　　　(　　　　　　(

TABLE 7.7

COMPARISON OF ALTERNATIVE 7 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
6	6a. CAA - Title 42 USC /7401 et seq.		x				x	
	6b. NESHAPs - Title 40 CFR Part 61.		x				x	
	6c. SCAQMD Regulation X - Adopting Federal Standards.		x				x	
7	7a. CAA - Title 42 USC /7401 et seq.		x				x	
	7b. NSPSs -Title 40 CFR Part 60.		x				x	
	7c. SCAQMD Regulation IX - Adopting Federal Standards.		x				x	
8	8a. ARA - California Health and Safety Code /39000 et seq.	x					x	
	8b. California SIP.	x					x	
Chemical-Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x					x	
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x					x	
10	10a. RCRA - Title 42 USC /6901 et seq.	x					x	
	10b. HWCA - California Health and Safety Code, Div. 20, Ch. 6.5 /25100 et seq.	x					x	
	10c. Criteria for Identifying Hazardous Wastes - Title 22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x					x	
Chemical-Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x				x	
Location-Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x					x	

TABLE 7.7

COMPARISON OF ALTERNATIVE 7 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
13	13a. ESA - Title 16 USC /1531-1534.	x					x	
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x					x	
	13c. Environmental Protection Agency - Title 40 CFR°/6.302(h).	x					x	
	13d. California Endangered Species Act - California Fish and Game Code /2050-2098.	x					x	
Location-Specific - Land Use								
14	14a. AHPA - Title 16 USC /469 et seq.	x					x	
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x					x	
15	15a. Postclosure Land Use - Title 27 CCR /21190.		x				x	
Action-Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR /66264.170-62264.178.		x				x	
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch. 12, /66262.10-66262.89.	x					x	
18	18a. Land Disposal Requirements - Title 22 CCR, Div.°4.5, Ch. 18, /66268.1, et seq. (onsite and offsite disposal).	x						
19	19a. Transportable and Fixed Treatment Units - Title°22 CCR, Div. 4.5, Ch. 45, /67450.3.	x					x	
20	20a. RCRA - Closure and Postclosure for Landfill Closures - Title 22 CCR°/66264.111-66264.120.		x				x	

TRC
Customer-Focused Solutions

TABLE 7.7

COMPARISON OF ALTERNATIVE 7 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
21	21a. CAMU - Title 22 CCR /66264.552 and /66264.553.		x				x	
22	22a. SWMA - Title 27 CCR /20919.		x				x	
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR / 20921.		x				x	
24	24a. Monitoring During Closure and Postclosure Title 27 CCR /20923.		x				x	
25	25a. Perimeter Monitoring During Closure and Postclosure - Title 27 CCR /20925.		x				x	
26	26a. Structure Monitoring During Closure and Postclosure - Title 27 CCR /20931.		x				x	
27	27a. Monitoring Parameters During Closure and Postclosure - Title 27 CCR /20932.		x				x	
28	28a. Monitoring Frequency During Closure and Postclosure - Title 27 CCR /20933.		x				x	
29	29a. Landfill Gas Control - Title 27 CCR /20937.		x				x	
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR /20800.		x				x	
31	31a. Drainage and Erosion Control - Title 27 CCR°/21150.	x					x	
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR /20650.		x				x	
33	33a. Security at Closed Sites - Title 27 CCR /21135.		x				x	
34	34a. Final Cover Standards - Title 27 CCR /21140.	x					x	
35	35a. Postclosure Land Use - Title 27 CCR /21190.		x				x	
36	36a. Final Grade - Title 27 CCR /21142.	x					x	
37	37a. Slope Stability (Final Site Face) - Title 27 CCR°/21145.	x					x	

TABLE 7.7

COMPARISON OF ALTERNATIVE 7 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR /21160.	x					x	
39	39a. Leachate Collection and Removal Systems - Title 27 CCR /20340.		x				x	
40	40a. Precipitation and Drainage Controls - Title 27 CCR /20365.		x				x	
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR /20310 (d), /20320 and /20360.		x				x	
42	42a. Vadose Zone Monitoring - Title 27 CCR /20415 (d).		x				x	
43	43a. Postclosure Care and Use of Property - Title 27 CCR /21180.	x					x	
44	44a. Closure and Postclosure Care - Title 22 CCR /66264.310.		x				x	
45	45a. Seismic Design Standards - Title 22 CCR /66264.25 (b).		x				x	
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR /21090.	x					x	
Action-Specific - Water Quality (2)								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch. 14, Art. 6, /66264.95-66264.99.		x				x	Monitoring only.
48	48a. Ground Water Monitoring - Title 27 CCR /20405, /20415-20430.		x		x			Monitoring only.

TABLE 7.7

COMPARISON OF ALTERNATIVE 7 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	COMMENTS
49	49a. SWRCB - Porter-Cologne Water Quality Control Act - /13000, /13140 and /13240.	x					x	Ground water remediation not included.
	49b. SWRCB Resolution No. 88-63.	x					x	
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x					x	
50	50a. SWRCB Resolution No. 68-16.		x				x	Ground water remediation not included.
50A	50A. SDWA - Title 40 CFR /300f, et seq.; 40 CFR Part 144 /3020.						x	Ground water remediation not included.
Action-Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, /39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x					x	
52	52a. Nuisance - Rule 402.	x					x	
53	53a. Fugitive Dust - Rule 403.	x					x	
54	54a. Particulate Matter (Concentration) - Rule 404.	x					x	
55	55a. Solid Particulate Matter - Rule 405.	x					x	
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x					x	
57	57a. Circumvention - Rule 408.	x					x	
58	58a. Combustion - Rule 409.	x					x	
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x					x	
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	
61	61a. Excavation of Landfill Site - Rule 1150.		x				x	
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x					x	

TABLE 7.7

COMPARISON OF ALTERNATIVE 7 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevent and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
To Be Considered Criteria								
63	63a. USEPA Region IX Preliminary Remediation Goals.			x			x	
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x			x	
65	65a. Use of Area of Contamination Concept During RCRA Cleanups: Memo March 13, 1996.			x			x	
	65b. NCP Title 55 FR Pages 8758-8760 (March 8, 1990).			x			x	
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x					x	

94-256/Rpts/SFS Rev. 2.0/Tbls&Figs (7/25/00/rm)

(1) ARAR is not germane to Alternative 7.
(2) Ground water monitoring, if selected, would be implemented along with one of Remedial Alternatives 2 to 6.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.3.8 ALTERNATIVE 8

7.3.8.1 Alternative 8 Evaluation

1. The ARARs were individually reviewed to evaluate whether they were applicable, relevant and appropriate or not germane to this alternative. The alternative was then analyzed for its compliance with the ARARs. ARARs 2-4 and 47-50A are germane to Alternative 8. This evaluation is summarized in Table 7.8 and is discussed below.

2. Alternative 8 includes a pump and treat component as well as ground water monitoring for compliance. Ground water extraction and treatment, if selected, would be implemented along with one of the Remedial Alternatives 2 to 6. ARARs 2-4 establish permissible contaminant concentration levels and/or water quality cleanup objectives, which are applicable to ground water and/or surface waters. Construction and O&M activities associated with Alternative 8 will be monitored to determine compliance with these levels and cleanup objectives.

3. ARARs 47 and 48 establish requirements for ground water monitoring. ARARs 47 and 48 will be met through the Alternative 8 ground water monitoring program. ARARs 49 and 50 establish state policy on treatment levels and maintenance of high water quality for beneficial use by the public. ARARs 49 and 50 will be met through the employment of a pump and treat ground water system. ARAR 50A is applicable to ground water reinjection. ARAR 50A will be complied with by designing a pump and treat and reinjection system that will meet the requirements of the ARAR.

7.3.8.2 CONCLUSIONS

1. Section 7.3.7 and Table 7.8 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 8. As discussed in Section 7.3.7 and Table 7.8, ARARs 2-4, and 47-50A are germane to Alternative 8. The remaining ARARs are not germane to Alternative 8 as this alternative, if selected, will be combined with Alternatives 2-6, which do not contain a ground water treatment component. Alternative 8 will comply with the germane ARARs.

TABLE 7.8

COMPARISON OF ALTERNATIVE 8 AND ARARS
WASTE DISPOSAL, INC. SUPERFUND SITE

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
Chemical Specific - Water Quality								
1	1a. CWA - Title 33 USC /1251-1387.	x					x	
	1b. NPDES - Title 40 CFR Part 122.	x					x	
	1c. NPDES - General Permit for Stormwater Discharges Associated with Construction Activities (Water Quality Order 99-08-DWQ).	x					x	
	1d. NPDES - General Permit for Stormwater Discharges Associated with Industrial Activities (Water Quality Order 97-03-DWQ).	x					x	
2	2a. SDWA - Title 42 USC /300f-300j-26.		x		x			
	2b. California Safe Drinking Water Act - California Health and Safety Code /116270-116751.		x		x			
	2c. National Primary Drinking Water Regulations - Title 40 CFR Part 141.		x		x			
	2d. Primary Drinking Water Quality Standards - Title 22 CCR, Ch. 15, /64431 and /64444.		x		x			
3	3a. SWRCB - Porter-Cologne Water Quality Control Act - /13170 and /13241.	x			x			
	3b. Water Quality Control Plan - Los Angeles Basin - Water Quality Objectives.	x			x			
4	4a. SWRCB Resolution No. 92-49 Section III (g).		x		x			
Chemical Specific - Air Quality								
5	5a. CAA - Title 42 USC /7401 et seq.	x					x	
	5b. NAAQS - Title 40 CFR /50.1-50.11.	x					x	
	5c. Ambient Air Quality Standards - Title 17 CCR, Div. 3, Ch.1, Subch. 1.5, Art. 2, /70101 and /70200.	x					x	

TABLE 7.8

COMPARISON OF ALTERNATIVE 8 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	COMMENTS
6	6a. CAA - Title 42 USC /7401 et seq.		x				x	
	6b. NESHAPs - Title 40 CFR Part 61.		x				x	
	6c. SCAQMD Regulation X - Adopting Federal Standards.		x				x	
7	7a. CAA - Title 42 USC /7401 et seq.		x				x	
	7b. NSPSs -Title 40 CFR Part 60.		x				x	
	7c. SCAQMD Regulation IX - Adopting Federal Standards.		x				x	
8	8a. ARA - California Health and Safety Code /39000 et seq.	x					x	
	8b. California SIP.	x					x	
Chemical Specific - Waste Delineation and Management								
9	9a. TSCA- Title 15 USC /2601-2692.	x					x	
	9b. Storage and Disposal Requirements of PCBs - Title 40 CFR /761.50-761.79.	x					x	
10	10a. RCRA - Title 42 USC /6901 et seq.	x					x	
	10b. HWCA - California Health and Safety Code, Div. 20, Ch. 6.5 /25100 et seq.	x					x	
	10c. Criteria for Identifying Hazardous Wastes - Title 22 CCR, Div. 4.5, Ch. 11, /66261.1-66261.126.	x					x	
Chemical Specific - Landfill Gases								
11	Gas Monitoring and Control During Closure - Title 27 CCR /20921.		x				x	
Location Specific - Endangered Species and Migratory Birds								
12	12a. Migratory Bird Treaty - Title 16 USC /703-712.	x					x	

TRC Customer-Focused Solutions

TABLE 7.8

COMPARISON OF ALTERNATIVE 8 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
13	13a. ESA - Title 16 USC /1531-1534.	x					x	
	13b. Protection of Endangered and Threatened Species - Title 50 CFR Parts 200 and 402.	x					x	
	13c. Environmental Protection Agency - Title 40 CFR /6.302(h).	x					x	
	13d. California Endangered Species Act - California Fish and Game Code /2050-2098.	x					x	
Location Specific - Land Use								
14	14a. AHPA - Title 16 USC /469 et seq.	x					x	
	14b. National Historic Landmarks Program - Title 36 CFR Part 65.	x					x	
15	15a. Postclosure Land Use - Title 27 CCR /21190.		x				x	
Action Specific - Waste Management								
16	16a. Use and Management of Containers - Title 22 CCR /66264.170-62264.178.		x				x	
17	17a. Standards Applicable to Generators of Hazardous Waste - Title 22 CCR, Div. 4.5, Ch. 12, /66262.10-66262.89.	x					x	
18	18a. Land Disposal Requirements - Title 22 CCR, Div. 4.5, Ch. 18, /66268.1, et seq. (onsite and offsite disposal).	x					x	
19	19a. Transportable and Fixed Treatment Units - Title 22 CCR, Div. 4.5, Ch. 45, /67450.3.	x					x	

TABLE 7.8

COMPARISON OF ALTERNATIVE 8 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
	Action Specific - Landfill Closure							
20	20a. RCRA - Closure and Postclosure for Landfill Closures - Title 22 CCR /66264.111-66246.120.		x				x	
21	21a. CAMU - Title 22 CCR /66264.552 and /66264.553.		x				x	
22	22a. SWMA - Title 27 CCR /20919.		x				x	
23	23a. Gas Monitoring and Control During Closure and Postclosure - Title 27 CCR /20921.		x				x	
24	24a. Monitoring During Closure and Postclosure Title°27 CCR /20923.		x				x	
25	25a. Perimeter Monitoring During Closure and Postclosure - Title 27 CCR /20925.		x				x	
26	26a. Structure Monitoring During Closure and Postclosure - Title 27 CCR /20931.		x				x	
27	27a. Monitoring Parameters During Closure and Postclosure - Title 27 CCR /20932.		x				x	
28	28a. Monitoring Frequency During Closure and Postclosure - Title 27 CCR /20933.		x				x	
29	29a. Landfill Gas Control - Title 27 CCR /20937.		x				x	
30	30a. Dust Control for Landfill and Disposal Sites - Title 27 CCR /20800.		x				x	
31	31a. Drainage and Erosion Control - Title 27 CCR /21150.	x					x	
32	32a. Grading of Fill Surface at Landfill and Disposal Sites - Title 27 CCR /20650.		x				x	
33	33a. Security at Closed Sites - Title 27 CCR /21135.		x				x	
34	34a. Final Cover Standards - Title 27 CCR /21140.	x					x	
35	35a. Postclosure Land Use - Title 27 CCR /21190.		x				x	

TABLE 7.8

COMPARISON OF ALTERNATIVE 8 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
36	36a. Final Grade - Title 27 CCR /21142.	x					x	
37	37a. Slope Stability (Final Site Face) - Title 27 CCR'/21145.	x					x	
38	38a. Landfill Gas Control and Leachate Contact Prevention - Title 27 CCR /21160.	x					x	
39	39a. Leachate Collection and Removal Systems - Title'27 CCR /20340.		x				x	
40	40a. Precipitation and Drainage Controls - Title 27 CCR /20365.		x				x	
41	41a. General Criteria for Waste Management Units and Containment Structures - Title 27 CCR /20310(d), /20320 and /20360.		x				x	
42	42a. Vadose Zone Monitoring - Title 27 CCR'/20415(d).		x				x	
43	43a. Postclosure Care and Use of Property - Title 27 CCR /21180.	x					x	
44	44a. Closure and Postclosure Care - Title 22 CCR'/66264.310.		x				x	
45	45a. Seismic Design Standards - Title 22 CCR'/66264.25(b).		x				x	
46	46a. Closure and Postclosure Maintenance Requirements for Disposal Sites and Landfills - Title 27 CCR /21090.	x					x	
Action Specific - Water Quality								
47	47a. Water Quality Monitoring Requirements for Permitted Facilities - Title 22 CCR, Div. 4.5, Ch.'14, Art. 6, /66264.95-66264.99.		x		x			
48	48a. Ground Water Monitoring - Title 27 CCR'/20405, /20415-20430.		x		x			

TRC
Customer-Focused Solutions

TABLE 7.8

COMPARISON OF ALTERNATIVE 8 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS						COMMENTS
		Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	
49	49a. SWRCB - Porter-Cologne Water Quality Control Act - /13000, /13140 and /13240.	x			x			
	49b. SWRCB Resolution No. 88-63.	x			x			
	49c. Los Angeles RWQCB Resolution 89-03 (adopting Resolution 88-63 into Basin Plan).	x			x			
50	50a. SWRCB Resolution No. 68-16.		x		x			
50A	50A. SDWA - Title 40 CFR /300f, et seq.; 40 CFR Part 144 /3020.				x			
Action Specific - Air Quality								
ARA, California Health and Safety Code - Title 17, Div. 26, Part III, /39000, et seq. (SCAQMD Rules).								
51	51a. Visible Emissions - Rule 401.	x					x	
52	52a. Nuisance - Rule 402.	x					x	
53	53a. Fugitive Dust - Rule 403.	x					x	
54	54a. Particulate Matter (Concentration) - Rule 404.	x					x	
55	55a. Solid Particulate Matter - Rule 405.	x					x	
56	56a. Liquid and Gaseous Air Contaminants - Rule 407.	x					x	
57	57a. Circumvention - Rule 408.	x					x	
58	58a. Combustion - Rule 409.	x					x	
59	59a. Disposal of Solid and Liquid Waste - Rule 473.	x					x	
60	60a. Emulsified Asphalt - Rule 1108.1.	x					x	
61	61a. Excavation of Landfill Site - Rule 1150.		x				x	
62	62a. VOC Emissions from Decontamination of Soil - Rule 1166.	x					x	

TRC
Customer-Focused Solutions

TABLE 7.8

COMPARISON OF ALTERNATIVE 8 AND ARARs
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

ARAR NUMBER	CITATION	ANALYSIS: Applicable	Relevant and Appropriate	To Be Considered	Complies	Does Not Comply	Not Germane to this Alternative(1)	COMMENTS
To Be Considered Criteria								
63	63a. USEPA Region IX Preliminary Remediation Goals.			x			x	
64	64a. USEPA Region IX Provisional Site-Specific Indoor Air and Soil Gas Standards.			x			x	
65	65a. Use of Area of Contamination Concept during RCRA cleanups: Memo March 13, 1996.			x			x	
	65b. NCP Title 55 FR pages 8758-8760 (March 8, 1990).			x			x	
66	66a. USEPA Technical Guidance Document, Final Covers on Hazardous Waste Landfills and Surface Impoundments.	x					x	

94-256/Reports/SFS Rev. 2.0 (7/24/00/jb)

(1) ARAR is not germane to Alternative 8 because activities regulated are not part of Alternative 8, but may apply to other alternatives.
(2) Ground water extraction and treatment, if selected, would be implemented along with one of Remedial Alternatives 2 to 6.

Abbreviations used in this table:

AHPA = Archaeological and Historic Preservation Act
ARA = Air Resources Act
ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CAMU = Corrective Action Management Units
CCR = California Code of Regulations
CFR = Code of Federal Regulations
CWA = Clean Water Act
DWQ = Department of Water Quality
ESA = Endangered Species Act
FR = Federal Register
HWCA = Hazardous Waste Control Act
NAAQS = National Ambient Air Quality Standards
NCP = National Contingency Plan
NESHAP = National Emission Standards for Hazardous Air Pollutants
NPDES = National Pollutant Discharge Elimination System
NSPS = New Source Performance Standards
RCRA = Resource Conservation And Recovery Act
RWQCB = Regional Water Quality Control Board
SCAQMD = South Coast Air Quality Management District
SDWA = Safe Drinking Water Act
SIP = State Implementation Plan
SWMA = Solid Waste Management Act
SWRCB = State Water Resource Control Board
TSCA = Toxic Substances Control Act
USC = United States Code
USEPA = United States Environmental Protection Agency
VOC = Volatile Organic Compounds

7.4 REMEDIAL ALTERNATIVES

1. The remedial technologies incorporated in each of the assembled Remedial Alternatives 1 through 6 are summarized in Table 7.9. Remedial Alternatives 7 and 8 are not included in Table 7.9 as they address only ground water. Each of the remedial alternatives are described and analyzed in the following subsections.

2. Cost estimates for each alternative are summarized in Tables 7.10 through 7.17. A detailed cost analysis for each alternative is provided in Appendix B.

3. Evaluations of each alternative for compliance with ARARs are discussed in the following sections and are summarized in Tables 7.1 through 7.8.

4. Evaluations of cost are provided directly by the present-worth dollar value of the alternative for a 30-year period. Cost-effectiveness can be determined by comparison of the dollar cost with the relative ratings of each alternative for other criteria. A summary of the major remedial costs for each alternative is provided in Tables 7.10 through 7.17. Details of the cost estimates for each alternative are presented in Appendix B. Monitoring is required for a remedy that leaves waste in place. In addition to the costs for obtaining and analyzing the samples necessary for monitoring the Site, costs have also been included for annual reports of monitoring activities. The OM&M costs were calculated for alternatives where wastes were left onsite and the containment, isolation and monitoring systems will require maintenance.

5. In addition to the seven criteria discussed above, NCP criteria include state and public acceptance in remedy selection. These two modifying criteria will be evaluated following receipt of comments on the SFS, and will be addressed in the ROD.

7.4.1 ALTERNATIVE 1 - NO FURTHER ACTION

1. This alternative is required by the NCP to provide a basis for comparison of other alternatives. Under this alternative, further actions would not be taken to restrict access to the Site or reduce the potential for exposure.

2. The No Further Action alternative would include continuation of the current Site ground water monitoring program.

3. The cost estimate for this alternative is presented in Table 7.10.

4. Figure 7.8 shows a recent aerial photograph of the No Further Action alternative for comparison purposes.

5. Evaluation of Alternative 1 by the NCP criteria is as follows:

- **Overall Protection of Human Health and Environment**:
  - The No Further Action alternative would not provide improved protection of human health and the environment. Although there is currently not a complete exposure pathway for contaminated soils or Site liquids, future activities at the Site could create one. Soil gas concentrations are currently at acceptable levels for protection of human health and the environment, but may not remain at these levels under this alternative. Hence, the No Further Action alternative would not be protective of human health.
  - Current indications are that the Site has not contributed to regional ground water problems. Although the bulk of the Site liquids have been removed with the completion of TM No. 13, they may reoccur over extended periods of time under the No Further Action alternative. This may ultimately present a threat to regional ground water quality. Hence, the No Further Action alternative may not be protective of the environment.
- **Compliance With ARARs**:
  - Alternative 1 is the No Further Action alternative. The NCP requires that No Further Action be considered in the Remedial Action evaluation and it is therefore retained to provide a basis for comparison with other Remedial Actions. The No Further Action alternative as presented, implies that further Remedial Action would not be taken. For this project the EPA has included ground water monitoring to document Site conditions.
  - The ARARs germane to this alternative include ARARs 2-4 and 48. Alternative 1 will not comply with ARARs 2-4 since this alternative does not include treatment. The present ground water monitoring will comply with ARAR 48. The remaining ARARs are not germane since this Alternative does not allow for Remedial Actions.
- **Long-Term Effectiveness and Permanence**:
  - The No Further Action alternative does not provide long-term effectiveness and permanence. Although current conditions for Site liquids, regional ground water and soil gas are at acceptable levels for protection of human health and the environment, they may not remain in these conditions in the future under this alternative.
- **Reduction of TMV**:
  - The No Further Action alternative does not provide a reduction of TMV and is not considered a treatment option.
- **Short-Term Effectiveness**:
  - Since no remedial action would occur under this alternative, current effects of the Site on the environment would remain unchanged. Increased short-term effects or exposure would not occur to onsite workers or the community.

- **Implementability**:
  - The implementability criterion is not applicable for the No Further Action alternative. **(Shelby)**
- **Cost**:
  - Total costs associated with the No Further Action alternative are \$629,155. These costs are related to the continued ground water monitoring and reporting that would be required under this alternative. A cost summary is presented in Table 7.10. A detailed cost analysis is presented in Appendix B.

7.4.2 ALTERNATIVE 2 - RCRA-EQUIVALENT CAP OVER RESERVOIR; MONOFILL CAP OVER BURIED WASTE OUTSIDE RESERVOIR (AREAS 1, 2, 4, 5, 6, 7 AND 8); RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent cap over the reservoir and a monofill cap over buried waste outside the reservoir to provide containment for the buried waste and serve as a continuous physical barrier. The monofill cap can be used when the level of protection it provides is equivalent to that of a RCRA cap, as described in Section 5.1.3. The monofill cap would cover areas underlain by waste materials in Areas 1, 2 (excluding the reservoir), 4, 5, 6, 7 and 8. The RCRA-equivalent cap would cover approximately 306,000 square feet (ft^2) of area. A total of approximately 546,000 ft^2 of area would be covered by the monofill cap over portions of Areas 1, 2, 4, 5, 6, 7 and 8.

2. The reservoir would be covered by a RCRA-equivalent cap consisting of, from the top down:
   - A 2-foot-thick vegetative layer.
   - A single-sided geocomposite drainage layer.
   - A 60-mil-thick HDPE geomembrane barrier layer.
   - A single-sided geocomposite gas collection layer.
   - A foundation layer (approximately 2 feet thick).

3. A gas collection system would be installed beneath the RCRA-equivalent cap over the reservoir where the potential for gas generation is the greatest. This system would consist of a geocomposite collection layer and a network of collector pipes installed immediately beneath the geomembrane barrier layer. Initially, the gas collection system would be operated as an active system by using a blower to create negative pressure on the system. In time it is anticipated that gas volumes will be low enough that the blower could be turned off and the system run as a passive gas collection system. The extracted gases would be treated by an appropriate technology, such as carbon adsorption.

4. Waste materials at the Site are presently covered by approximately 5 to 10 feet of fill material. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} cm/sec (TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 to 6 feet of the fill soils is typically free of significant quantities of construction debris. The existing fill material typically satisfies the performance requirements for a monofill cap (i.e., it has low permeability and will minimize infiltration of surface water; it will promote drainage and [with suitable vegetation] will minimize erosion; it will accommodate settling and subsidence; and it will function with a minimum of maintenance); however, it will be checked for compliance with the requirements during implementation of the alternative as described in Section 6.1.1.3.3 and areas of noncompliance will be corrected. Approximately 70,000 ft^2 of area to be covered by a monofill cap is also presently covered by asphalt and/or concrete pavement, which enhances the containment of the buried waste. The surface of unpaved areas would be regraded, where necessary, to improve drainage, vegetated with drought-resistant native plants to provide protection against erosion and equipped with an irrigation system to support the vegetation. The irrigation system would be carefully controlled to prevent overwatering which could lead to increases in the amount of liquids in contact with the waste. Controls may include watering schedules and soil moisture monitors (e.g., neutron probes). Areas that are currently paved would be repaired, as necessary, to enhance containment of the buried waste.

5. The LCPs (e.g., recovery wells) would be installed within the reservoir boundary to monitor for existence of "free-liquids" within buried waste. "Free liquids" collecting at these points would be purged and removed from the Site for treatment and disposal at an EPA-approved disposal facility. Locations for the LCPs would be established during remedial design.

6. Passive bioventing wells would be installed along portions of the perimeter of buried waste in areas where elevated soil gas concentrations are occurring. These wells would be provided with one-way check valves. Some of the wells would have check valves arranged to allow atmospheric oxygen to enter during high pressure conditions. The remaining wells would have check valves arranged to vent subsurface gas during low pressure conditions. This would gradually convert the subsurface environment from anaerobic to aerobic, with a resultant decrease in the production of methane gas.

7. Some of the existing buildings in Areas 2, 5 and 8 (e.g., 9843 Greenleaf Avenue, 12637 B, 12801 and 12747 Los Nietos Road) are suspected of being constructed over the buried waste materials. These buildings would be provided with engineering controls to prevent the

potential build-up of soil gases in their interiors. The engineering controls may consist of: sealing penetrations in the floor slabs; installation of passive or active gas venting systems below floor slabs; installation of positive pressure heating, ventilation and air conditioning improvements; or some combination of these controls as discussed in Sections 5.5 and 6.1.5.

8. Institutional controls would be used to protect human health at the Site by preventing exposure to buried waste through implementation of restrictions on use of property by owners via: (1) the recordation of restrictive environmental easements; (2) implementation of local governmental land use or zoning restrictions; (3) restrictive physical access to property by controls such as signage. Institutional controls to be considered for the Site are listed in Tables 5.10 and 7.18.

9. The cost estimate for this alternative is presented in Table 7.11.

10. Figure 7.9 shows the general location of the various remedial components for Alternative 2.

11. Evaluation of Alternative 2 by the NCP criteria is as follows:
    - **Overall Protection of Human Health and Environment**:
        - Construction of the RCRA-equivalent and monofill caps would provide a barrier to exposure to the underlying waste materials. This barrier function along with the institutional controls (e.g., restricting future Site uses that could affect the integrity of the cap, not allowing planting of deep-rooting plants in capped areas and other institutional controls shown in Tables 5.10 and 7.18) would effectively mitigate potential impacts to a level that is protective of human health and the environment from solid wastes.
        - The cap would reduce infiltration of surface water, thus reducing the potential for future migration of waste to ground water. The combination of reduced infiltration and reservoir LCPs described in Section 6.1.3 would effectively mitigate potential impacts to a level that is protective of human health and the environment from reservoir liquids.
        - The RCRA-equivalent cap would provide a horizontal barrier for control of soil gas. The gas barrier in a RCRA-equivalent cap, in combination with perimeter bioventing wells and engineering controls in buildings described in Section 6.1.5, would effectively mitigate potential impacts to a level that is protective of human health and the environment from soil gas.
        - Ground water is addressed in a separate alternative, as such, Alternative 2 includes only ground water monitoring. Implementation of ground water monitoring would provide improved protection of human health and the environment in that it will provide an early warning should COCs begin migrating to the ground water.

TRC
Customer-Focused Solutions

In addition, reduction of potential future impacts to ground water due to reservoir liquids and soil gas resulting from Alternative 2 would also be protective of human health and the environment.

- **Compliance with ARARs**:
  - Section 7.3.2 and Table 7.2 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 2. As discussed in Section 7.3.2 and Table 7.2, ARARs 2-4, 18, 21, 50A, 58-62 and 65 are designated "Not Germane" since this alternative does not contain a ground water treatment program, onsite excavation, SVE units or the use of emulsified asphalt. Except for the ARARs that have been designated Not Germane, the remaining ARARs will be complied with in Alternative 2.
- **Long-Term Effectiveness and Permanence**:
  - Alternative 2 would provide adequate long-term effectiveness and permanence, as long as O&M activities are properly carried out and institutional controls (Tables 5.10 and 7.18) are maintained. Institutional controls that protect the long-term integrity of the remedy components, such as restricting penetrations of the cap, are particularly important for assuring long-term effectiveness and permanence. Hazardous waste caps have been shown to be highly effective for providing a barrier to contact with wastes, controlling infiltration of surface water and controlling migration of soil gas at numerous sites. As shown in the TM No. 13 Treatability Study, reservoir LCPs would provide long-term effectiveness and permanence for removal of reservoir liquids.
  - Operation of the soil gas collection layer in a RCRA-equivalent cap and perimeter bioventing wells would achieve long-term effectiveness and permanence by reducing soil gas levels, decreasing methane generation and degrading some portion of subsurface petroleum hydrocarbons. However, data is not available to predict the level of degradation that would occur or the length of time it may require.
  - Since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, ground water monitoring will provide a level of long-term effectiveness and permanence by providing a warning should COCs at the Site begin migrating to ground water. In addition, the long-term effectiveness and permanence for removal of reservoir liquids and soil gas would improve protection of ground water.
- **Reduction of TMV**:
  - Placement of the cap in Alternative 2 would reduce the mobility of the waste by providing containment, reducing infiltration of surface water and controlling migration of soil gas. Alternative 2 would achieve a reduction in TMV through the removal and treatment of soil gas and reservoir liquids. In addition, the perimeter bioventing wells would promote degradation of a portion of the waste mass. With respect to ground water, Alternative 2 would not provide a reduction of TMV. However, as indicated above, ground water is addressed in a separate alternative.

- **Short-Term Effectiveness**:
  - During implementation of Alternative 2, a slight increase in short-term risks would be observed due to construction activities. Potential increases in short-term exposures to COCs could occur during grading for the cap, and construction of the LCPs and passive bioventing wells. However, use of standard VOC, odor and particulate controls and waste management practices would effectively mitigate potential impacts to a level that is protective of human health and the environment.
- **Implementability**:
  - The remediation technologies included in Alternative 2 are readily implementable using standard construction procedures. RCRA-equivalent and monofill caps have been successfully constructed at numerous sites. Cap construction techniques are documented in guidance manuals, building codes and engineering text books. There are a sufficient number of contractors possessing suitable cap construction experience doing business in the Site area to assure that Alternative 2 can be readily implemented. Similar conditions exist for the other components of Alternative 2.
  - Institutional controls (Tables 5.10 and 7.18) are implementable through existing regulatory mechanisms and private negotiations between PRPs and landowners, as described in Section 5.1.2.
- **Cost**:
  - Total costs associated with Alternative 2 are estimated to be $6,958,918. This includes capital costs for construction of the RCRA-equivalent cap, monofill cap, reservoir LCPs and soil gas engineering controls. This also includes present day costs (NPV) for long-term operation, maintenance and monitoring.

7.4.3 ALTERNATIVE 3 - RCRA-EQUIVALENT ASPHALT CAP OVER RESERVOIR AND AREA 2; ASPHALT CAP OVER PORTIONS OF AREAS 1, 4, 5, 6, 7 AND 8 UNDERLAIN BY BURIED WASTE; SVE IN NONCOMPLIANCE AREAS (AREAS 5, 7 AND 8); RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent structural asphalt pavement section as a cap to provide containment for buried waste and serve as a continuous physical barrier in Area 2, including the reservoir. These types of caps can be used when the level of protection they provide is equivalent to that of a RCRA cap as described in Section 5.1.3. A total of approximately 739,200 ft^2 of area would be covered by asphalt pavement. The asphalt pavement would be underlain by a geomembrane barrier layer and a geocomposite gas collection layer. This cap would be equivalent in performance to a RCRA cap, since it provides an impermeable layer to control infiltration, it prevents exposure to wastes and controls the migration of soil gas.

2. An asphalt cap that does not include a geomembrane barrier layer or a geocomposite gas collection layer, would cover areas underlain by buried waste in Areas 1, 4, 5, 6, 7 and 8. This cap would provide protection that is equivalent to a RCRA cap. Since there are fewer wastes in these areas than in Area 2, there are less free-liquids and less potential for gas generation. Approximately 187,000 ft^2 of area would be covered by the asphalt cap. Approximately 76,800 ft^2 of this area is already covered by asphalt and/or concrete pavement, which satisfies the capping requirements. The use of an asphalt cover is sufficient to prevent infiltration. The surface of unpaved areas would be regraded where necessary to improve drainage, a layer of base course material would be placed and compacted, and then the area would be paved with asphalt. Areas that are currently paved, including foundations and slabs, would be repaired, as necessary, to enhance containment of the buried waste.

3. A gas collection system would be installed beneath the asphalt cap over Area 2 where the potential for gas generation is the greatest. This system would consist of a geocomposite collection layer and a network of collector pipes installed immediately beneath the geomembrane barrier layer. Initially, the gas collection system would be operated as an active system by using a blower to create a negative pressure on the system. In time, it is anticipated that the gas volumes would be low enough that the blower could be turned off and the system run as a passive gas collection system. The extracted gases would be treated by an appropriate technology, such as carbon adsorption.

4. In soil gas noncompliance areas (i.e., Areas 5, 7 and 8), a SVE system would be installed to control and remove VOCs and methane from the subsurface. Extraction and injection wells would be installed in selected locations. A vacuum would be applied to the extraction wells using a blower. Injection wells would be open to the atmosphere to allow fresh air into the subsurface to help remove the less volatile compounds and to create an aerobic environment. This latter purpose is intended to reduce the amount of methane being generated.

5. Similar to Alternative 2 and as indicated in Table 7.9, this alternative would also include reservoir LCPs, passive bioventing wells along portions of the perimeter of buried waste, engineering controls in existing buildings which are underlain by waste, and institutional controls.

6. The cost estimate for this alternative is presented in Table 7.12.

7. Figure 7.10 shows the general location of the various remedial components for Alternative 3.

8. Evaluation of Alternative 3 by the NCP criteria is as follows:

- **Overall Protection of Human Health and Environment:**
  - Construction of the RCRA-equivalent and asphalt caps would provide a barrier to exposure to the underlying waste materials. This barrier function along with the institutional controls (e.g., restricting future Site uses that could affect the integrity of the cap, not allowing planting of deep-rooting plants in capped areas and other institutional controls shown in Tables 5.10 and 7.18) would effectively mitigate potential impacts to a level that is protective of human health and the environment from solid wastes.
  - The cap would reduce infiltration of surface water, thus reducing the potential for future migration of waste to ground water. A combination of reduced infiltration and reservoir LCPs described in Section 6.1.3 would effectively mitigate potential impacts to a level that is protective of human health and the environment from reservoir liquids.
  - The RCRA-equivalent cap would provide a horizontal barrier for control of soil gas. The gas barrier in a RCRA-equivalent cap, in combination with an SVE system in the noncompliance areas, perimeter bioventing wells, engineering controls in the buildings described in Section 6.1.5, and institutional controls, would effectively mitigate potential impacts to a level that is protective of human health and the environment from soil gas.
  - Ground water is addressed in a separate alternative, as such, Alternative 2 includes only ground water monitoring. Implementation of ground water monitoring would provide improved protection of human health and the environment in that it will provide an early warning should COCs begin migrating to the ground water. In addition, reduction of potential future impacts to ground water due to reservoir liquids and soil gas resulting from Alternative 2 would also be protective of human health and the environment.

- **Compliance With ARARs:**
  - Section 7.3.3 and Table 7.3 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 3. As discussed in Section 7.3.3 and Table 7.3, ARARs 2-4, 18, 21, 50A, 60-62 and 65 are designated "Not Germane" since this alternative does not contain a ground water treatment program, onsite excavation, or the use of emulsified asphalt. Except for the ARARs that have been designated Not Germane, the remaining ARARs will be complied with in Alternative 3.

- **Long-Term Effectiveness and Permanence:**
  - Alternative 3 would provide adequate long-term effectiveness and permanence, as long as OM&M activities are properly carried out and institutional controls (Tables 5.10 and 7.18) are maintained. Institutional controls that protect the long-term integrity of the remedy components, such as restricting penetrations of the cap, are particularly important for assuring long-term effectiveness and permanence. Hazardous waste caps have been shown to be highly effective for providing a barrier to contact with wastes, controlling infiltration of surface water and controlling migration of soil gas at numerous sites.

As shown in the TM No. 13 Treatability Study, reservoir LCPs would provide long-term effectiveness and permanence for removal of reservoir liquids.

- Operation of a soil gas collection layer in the RCRA-equivalent cap, the SVE system in the noncompliance areas and perimeter bioventing wells would achieve long-term effectiveness and permanence by reducing soil gas levels, decreasing methane generation and by degrading some portion of subsurface petroleum hydrocarbons. However, data is not available to predict what level of degradation would occur or the length of time it may require.
- Since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, ground water monitoring will provide a level of long-term effectiveness and permanence by providing a warning should COCs at the Site begin migrating to ground water. In addition, the long-term effectiveness and permanence of removal of reservoir liquids and soil gas would improve protection of ground water.

- **Reduction of TMV**:
  - Placement of the cap in Alternative 3 would reduce the mobility of the waste by providing containment, reducing infiltration of surface water and controlling migration of soil gas. Alternative 3 would achieve a reduction in TMV through the removal and treatment of soil gas and reservoir liquids. In addition, the SVE system in the noncompliance areas and the perimeter bioventing wells would promote degradation of a portion of the waste mass. With respect to ground water, Alternative 3 would not provide a reduction of TMV. However, as indicated above, ground water is addressed in a separate alternative.
- **Short-Term Effectiveness**:
  - During implementation of Alternative 3, a slight increase in short-term risks could be observed due to construction activities. Potential increases in short-term exposures to COCs could occur during grading for the cap, and construction of the LCPs, SVE wells and passive bioventing wells. However, use of standard VOC, odor, particulate controls and waste management practices would effectively mitigate potential impacts to a level that is protective of human health and the environment.
- **Implementability**:
  - The remediation technologies included in Alternative 3 are readily implementable using standard construction procedures. RCRA-equivalent and asphalt caps have been successfully constructed at numerous sites. Cap construction techniques are documented in guidance manuals, building codes and engineering text books. There are a sufficient number of contractors possessing suitable cap construction experience doing business in the Site area to assure that Alternative 3 can be readily implemented. Similar conditions exist for the other components of Alternative 3.
  - Institutional controls (Tables 5.10 and 7.18) are implementable through existing regulatory mechanisms and private negotiations between PRPs and landowners, as described in Section 5.1.2.

- **Cost**:
  - Total costs associated with Alternative 3 are estimated to be \$10,442,274. This includes capital costs for construction of the RCRA-equivalent cap, asphalt cap, reservoir LCPs, SVE system in the noncompliance areas and other soil gas engineering controls. This also includes present day costs for long-term operation, maintenance and monitoring.

7.4.4 ALTERNATIVE 4 - RCRA-EQUIVALENT CAP OVER RESERVOIR; MONOFILL CAP OVER SELECTED PORTIONS OF AREAS 2, 4, 5 AND 7; EXCAVATION/ CONSOLIDATION OF BURIED WASTE FROM AREAS 1, 6 AND 8; SVE IN NONCOMPLIANCE AREAS (AREAS 5, 7 AND 8); RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent cap over the reservoir to provide containment for buried waste and serve as a continuous physical barrier. A total of approximately 306,000 ft^2 of area would be covered by the RCRA-equivalent cap. This cap would consist of, from the top down:

   - A 2-foot-thick vegetative layer.
   - A single-sided geocomposite drainage layer.
   - A 60-mil-thick HDPE geomembrane barrier layer.
   - A single-sided geocomposite gas collection layer.
   - A foundation layer (approximately 2 feet thick).

   This cross section is based on the Prefinal (90%) Design Report, Soils and Subsurface Gas Remedial Design (TRC, 1996). The design will be updated as necessary in the final design of the remedial alternative selected by EPA. It may be possible to use a thicker vegetative layer and eliminate the geocomposite drainage layer.

2. Outside of the reservoir (Areas 2, 4, 5 and 7), a monofill cap would be used to provide containment of wastes and serve as a continuous physical barrier. A monofill cap can be used when the level of protection it provides is equivalent to that of a RCRA cap, as described in Section 5.1.3. A total of approximately 384,000 ft^2 of area would be covered by a monofill cap. The waste materials underlying Areas 2, 4, 5 and 7 at the Site are presently covered by approximately 5 to 10 feet of fill material. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} cm/sec (TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 feet to 6 feet of the fill soils is typically free of significant quantities of construction debris. The existing fill material satisfies the performance requirements for a monofill cap,(i.e., it has low permeability and will minimize infiltration of surface water; it will promote drainage and [with suitable vegetation] will minimize erosion; it will accommodate settling and subsidence; and it

will function with a minimum of maintenance); however, it will be checked for compliance with the requirements during implementation of the alternative as described in Section 6.1.1.3.3. Approximately 31,500 ft^2 of the above area is also covered by asphalt and/or concrete pavement, which enhances containment of the buried waste. The surface of unpaved areas would be regraded where necessary to improve drainage, vegetated with drought-resistant native plants to provide protection against erosion, and equipped with an irrigation system to support vegetation. The irrigation system would be carefully controlled to prevent overwatering which could lead to increases in the amount of liquids in contact with the waste. Controls may include watering schedules and soil moisture monitors (e.g., neutron probes). Areas that are currently paved, including slabs and foundations, would be repaired, as necessary, to enhance containment of the buried waste.

3. Prior to construction of the RCRA-equivalent cap over the reservoir, approximately 8,500 cubic yards (yd^3) of the waste material in Areas 1, 6 and 8 would be excavated and consolidated within the reservoir boundary. During excavation of wastes, some form of vapor control may be necessary. Based on the results of TM No. 12, it is anticipated that odor and VOC control for waste excavations performed in areas outside the reservoir can be effectively accomplished using water and foam vapor suppressant sprays. If waste excavations are performed inside of the reservoir, more extensive means of odor and VOC control such as large domed enclosures maintained under negative air pressure may be necessary. Contingency costs are included in the remedial alternatives which include excavation to account for possible costs for vapor control (see Appendix B). The resulting excavations in Areas 1, 6 and 8 would be backfilled with clean, compacted fill material. This may reduce the need for certain institutional controls (Tables 5.10 and 7.18), such as access limitations and building modification restrictions at these three areas.

4. Similar to Alternative 2, the gas collection system beneath the RCRA-equivalent cap would initially be operated as an active system. In time, it is anticipated that gas volumes will be low enough that the blower could be turned off and the system run as a passive system. Collected gases would be treated by an appropriate technology, such as carbon adsorption.

5. As indicated in Table 7.9, this alternative would also include reservoir LCPs, SVE in noncompliance areas (i.e., Areas 5, 7 and 8), passive bioventing wells along portions of the perimeter of buried waste, engineering controls in existing buildings which are underlain by waste. The engineering controls may consist of: sealing penetrations in the floor slabs;

installation of passive or active gas venting systems below floor slabs; installation of positive pressure heating, ventilation and air conditioning improvements; or some combination of these controls as discussed in Sections 5.5 and 6.1.5.

6. Institutional controls would be used to protect human health at the Site by preventing exposure to buried waste through implementation of restrictions on use of property by owners via: (1) the recordation of restrictive environmental easements; (2) implementation of local governmental land use or zoning restrictions; (3) restrictive physical access to property by controls such as signage. Institutional controls to be considered for the Site are listed in Tables 5.10 and 7.18.

7. The cost estimate for this alternative is presented in Table 7.13. Furthermore, the costs associated with the excavation of buried waste can increase significantly due to one or more of the following items:
   - Volume of excavated buried waste could increase.
   - Requirements for extensive odor and VOC controls.
   - Offsite disposal costs, if reconsolidation is not practical due to geotechnical considerations, or insufficient cap volume is available.
   - Construction delays.

   Based on the discussion above, a contingency factor of 50 percent has been added to this alternative to address the potential cost growth issues associated with excavation. In addition, if the excavated wastes were hauled offsite for disposal, the estimated remediation costs would increase by approximately $2,435,000.

8. Figure 7.11 shows the general location of the various remedial components for Alternative 4.

9. Evaluation of Alternative 4 by the NCP criteria is as follows:
   - **Overall Protection of Human Health and Environment**:
     - Construction of the RCRA-equivalent and monofill caps would provide a barrier to exposure to the underlying waste materials. This barrier function, along with the institutional controls (e.g., restricting future site uses that could affect the integrity of the cap, not allowing planting of deep-rooting plants in capped areas and other institutional controls shown in Tables 5.10 and 7.18), would effectively mitigate potential impacts to a level that is protective of human health and the environment from solid wastes. In addition, excavation of buried wastes from Areas 1, 6 and 8 and consolidation under a RCRA-equivalent cap would increase the overall level of protection of human health and the environment by reducing the area underlain by waste materials.

- The cap would reduce infiltration of surface water, thus reducing the potential for future migration of waste to ground water. The combination of reduced infiltration and reservoir LCPs described in Section 6.1.3 would effectively mitigate potential impacts to a level that is protective of human health and the environment from reservoir liquids.
- The RCRA-equivalent cap would provide a horizontal barrier for control of soil gas. The gas barrier in a RCRA-equivalent cap, in combination with the SVE system in noncompliance areas, perimeter bioventing wells and engineering controls in buildings described in Section 6.1.5, would effectively mitigate potential impacts to a level that is protective of human health and the environment from soil gas.
- Ground water is addressed in a separate alternative, as such, Alternative 4 includes only ground water monitoring. Implementation of ground water monitoring as part of Alternative 4 would provide improved protection of human health and the environment in that it will provide an early warning should COCs begin migrating to the ground water. In addition, the reduction of potential impacts due to reservoir liquids and soil gas resulting from Alternative 4 would also be protective of human health and the environment.

- **Compliance With ARARs**:
  - Section 7.3.4 and Table 7.4 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 4. As discussed in Section 7.3.4 and Table 7.4, ARARs 2-4, 50A and 60 are designated "Not Germane" since this alternative does not contain a ground water treatment program or the use of emulsified asphalt. Except for the ARARs that have been designated Not Germane, the remaining ARARs will be complied with in Alternative 4.
- **Long-Term Effectiveness and Permanence**:
  - Alternative 4 would provide adequate long-term effectiveness and permanence, as long as OM&M activities are properly carried out and institutional controls (Tables 5.10 and 7.18) are maintained. Institutional controls that protect the long-term integrity of the remedy components, such as restricting penetrations of the cap, are particularly important for assuring long-term effectiveness and permanence. Hazardous waste caps have been shown to be highly effective for providing a barrier to contact with wastes, controlling infiltration of surface water and controlling migration of soil gas at numerous sites. As shown in the TM No. 13 Treatability Study, reservoir LCPs would provide long-term effectiveness and permanence for removal of reservoir liquids.
  - Excavation of buried wastes from Areas 1, 6 and 8 and consolidation under the RCRA-equivalent cap, would further improve long-term effectiveness and permanence of this alternative by placing the waste under the RCRA-equivalent cap. The total area underlain by waste materials would be significantly reduced. This would result in better containment of the waste, reduction of the potential for migration to the ground water and improved control of soil gas migration, thus improving protection of human health and the environment.

- Operation of the soil gas collection layer in a RCRA-equivalent cap, an SVE system in noncompliance areas and perimeter bioventing wells would achieve long-term effectiveness and permanence by reducing the soil gas levels, decreasing methane generation and by degrading some portion of the subsurface petroleum hydrocarbons. However, data is not available to predict the level of degradation that would occur or the length of time it may require.
- Since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, ground water monitoring will provide a level of long-term effectiveness and permanence by providing a warning should COCs at the Site begin migrating to ground water. In addition, the long-term effectiveness and permanence for removal of reservoir liquids and soil gas would improve protection of ground water.

- **Reduction of TMV**:
  - Excavation of buried wastes from Areas 1, 6 and 8 and consolidation under a RCRA-equivalent cap would not result in reduction of toxicity or volume of wastes. It may result in a decrease in mobility since the waste would be consolidated over the concrete in the bottom of the reservoir. The condition of the concrete is not well known.
  - Placement of the cap in Alternative 4 would reduce the mobility of the waste by providing containment, reducing infiltration of surface water and controlling migration of soil gas. Alternative 4 would achieve a reduction in TMV through the removal and treatment of soil gas and reservoir liquids. In addition, the SVE system in noncompliance areas and perimeter bioventing wells would promote degradation of a portion of the waste mass.
- **Short-Term Effectiveness**:
  - During implementation of Alternative 4, a significant increase in short-term risks could be observed due primarily to excavation of buried wastes from Areas 1, 6 and 8. Potential increases in short-term exposures to COCs could also occur during grading for the cap, and construction of the LCPs and passive bioventing wells. While these risks can be mitigated to a level protective of human health and the environment, it may require advanced VOC, odor and particulate controls, such as the use of an excavation dome.
- **Implementability**:
  - The remediation technologies included in Alternative 4 are implementable using relatively standard construction procedures. RCRA-equivalent and monofill caps have been successfully constructed at numerous sites. Cap construction techniques are documented in guidance manuals, building codes and engineering text books. There are a sufficient number of contractors possessing suitable cap construction experience doing business in the Site area to assure that Alternative 4 can be readily implemented. Similar conditions exist for the other components of Alternative 4.
  - Institutional controls (Tables 5.10 and 7.18) are implementable through existing regulatory mechanisms and private negotiations between PRPs and landowners, as described in Section 5.1.2.

- **Cost:**
  - Total costs associated with Alternative 4 are estimated to be $9,673,448. This includes capital costs for construction of the RCRA-equivalent cap, monofill cap, excavation of buried wastes from Areas 1, 6 and 8 and consolidation under the RCRA-equivalent cap, reservoir LCPs, an SVE system in noncompliance areas and other soil gas engineering controls. This also includes present day costs for long-term operation, maintenance and monitoring.

7.4.5 ALTERNATIVE 5 - RCRA-EQUIVALENT CAP OVER RESERVOIR; MONOFILL CAP OVER SELECTED PORTIONS OF AREAS 1, 2, 4, 6, 7 AND 8; EXCAVATION/ CONSOLIDATION OF WASTE ADJACENT TO BUILDINGS (AREAS 5, 8 AND WEST OF CORNER OF AREA 2); RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. Similar to Alternative 4, this alternative incorporates a RCRA-equivalent cap over the reservoir to provide containment for buried waste and serve as a continuous physical barrier. Areas covered by a RCRA-equivalent cap and a configuration of the cap are the same as discussed in Alternative 4. However, the amount of waste material excavated and moved to the reservoir is less under this alternative than under Alternative 4. As a result, more import fill would be required to attain desired grades, making the capping costs slightly higher under this alternative.

2. Outside of the reservoir, Areas 1, 2, 4, 6, 7 and 8, a monofill cap would be used to provide containment of buried waste and serve as a continuous physical barrier. This cap would provide protection that is equivalent to a RCRA cap since there are fewer wastes in these areas than in the reservoir, there are less free-liquids and there is less potential for gas generation. A total of approximately 464,300 ft^2 of area would be covered by a monofill cap. The waste material underlying Areas 1, 2, 4, 6, 7 and 8 at the Site is presently covered by approximately 5 to 10 feet of fill material. This fill material typically consists of relatively low permeability silty sand with a coefficient of permeability on the order of 10^{-7} cm/sec (TRC, 1999a). The fill is in a compacted and dry condition. The upper approximately 3 to 6 feet of fill soils is typically free of significant quantities of construction debris. The existing fill material satisfies the performance requirements for a monofill cap,(i.e., it has low permeability and will minimize infiltration of surface water; it will promote drainage and [with suitable vegetation] will minimize erosion; it will accommodate settling and subsidence; and it will function with a minimum of maintenance); however, it will be checked for compliance with the requirements during implementation of the alternative as described in Section 6.1.1.3.3 and areas of noncompliance will be corrected. Approximately 45,300 ft^2 of the area mentioned above is also covered by asphalt and/or concrete pavement, which enhances the containment of buried waste. The surface of unpaved areas would be regraded, where necessary, to improve drainage, vegetated with drought-resistant native plants to provide protection against erosion

and equipped with an irrigation system to support vegetation. The irrigation system would be carefully controlled to prevent overwatering which could lead to increases in the amount of liquids in contact with the waste. Controls may include watering schedules and soil moisture monitors (e.g., neutron probes). Areas that are currently paved, including foundations and slabs, would be repaired, as necessary, to enhance containment of the buried waste.

3. Prior to construction of a RCRA-equivalent cap over the reservoir, approximately 4,700 yd^3 of waste material adjacent to buildings in Areas 5, 8 and the west corner of Area 2 would be excavated and consolidated within the reservoir boundary. During excavation of wastes, some form of vapor control may be necessary. Based on the results of TM No. 12, it is anticipated that odor and VOC control for waste excavations performed in areas outside the reservoir can be effectively accomplished using water and foam vapor suppressant sprays. If waste excavations are performed inside of the reservoir, more extensive means of odors and VOC control such as large domed enclosures maintained under negative air pressure may be necessary. Contingency costs are included in the remedial alternatives which include excavation to account for possible costs for vapor control (see Appendix B). The resulting excavations in Areas 2, 5 and 8 would be backfilled with clean, compacted fill material. This may eliminate the need for certain institutional controls (Tables 5.10 and 7.18), such as access limitations and building modifications at these buildings.

4. Similar to Alternative 2, the gas collection system beneath a RCRA-equivalent cap would initially be operated as an active system. In time it is anticipated that gas volumes will be low enough hat the blower could be turned off and the system run as a passive system. Collected gases would be treated by an appropriate technology, such as carbon adsorption.

5. As indicated in Table 7.9, this alternative would also include reservoir LCPs, passive bioventing wells along portions of the perimeter of buried waste and engineering controls in existing buildings which are underlain by waste. The engineering controls may consist of: sealing penetrations in the floor slabs; installation of passive or active gas venting systems below floor slabs; installations of positive pressure heating, ventilation and air condition improvements; or some combination of these controls as discussed in Sections 5.5 and 6.1.5.

6. Institutional controls would be used to protect human health at the Site by preventing exposure to buried waste through implementation of restrictions on use of property by owners via: (1) the recordation of restrictive environmental easements; (2) implementation of local

governmental land use or zoning restrictions; (3) restrictive physical access to property by controls such as signage. Institutional controls to be considered for the Site are listed in Tables 5.10 and 7.18.

7. As discussed in Alternative 4, excavation of buried waste at the Site may present a number of issues and potential contingency costs. Therefore, a contingency factor of 50 percent has been added to this alternative. The cost estimate for this alternative is presented in Table 7.14. This cost estimate is based on onsite disposal of the excavated wastes. If the excavated wastes were taken offsite for disposal, the costs presented in Table 7.14 would increase by approximately $1,347,000.

8. Figure 7.12 shows the general location of the various remedial components for Alternative 5.

9. Evaluation of Alternative 5 by the NCP criteria is as follows:
   - **Overall Protection of Human Health and Environment**:
     - Construction of RCRA-equivalent and monofill caps would provide a barrier to exposure to the underlying waste materials. This barrier function, along with the institutional controls (e.g., restricting future site uses that could affect the integrity of the cap, not allowing planting of deep-rooting plants in capped areas and other institutional controls shown in Tables 5.10 and 7.18), would effectively mitigate potential impacts to a level that is protective of human health and the environment from solid wastes. In addition, excavation of buried wastes which is adjacent to buildings in Areas 5, 8 and the west corner of Area 2 with consolidation under a RCRA-equivalent cap, would increase the overall level of protection of human health and the environment by reducing the area underlain by waste materials.
     - The cap would decrease infiltration of surface water, thus reducing the potential for future migration of waste to ground water. The combination of reduced infiltration and reservoir LCPs described in Section 6.1.3 would effectively mitigate potential impacts to a level that is protective of human health and the environment from reservoir liquids.
     - The RCRA-equivalent cap would provide a horizontal barrier for control of soil gas. The gas barrier in a RCRA-equivalent cap, in combination with excavation of buried wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2, perimeter bioventing wells and engineering controls in the buildings described in Section 6.1.5, would effectively mitigate potential impacts to a level that is protective of human health and the environment from soil gas.
     - Ground water is addressed in a separate alternative, as such, Alternative 5 includes only ground water monitoring. Implementation of ground water monitoring as part of Alternative 5 would provide improved protection of human health and the environment in that it will provide an early warning should COCs begin migrating to the ground water. In addition, reduction of

potential impacts to ground water due to reservoir liquids and soil gas resulting from Alternative 5 would also be protective of human health and the environment.

- **Compliance With ARARs**:
  - Section 7.3.5 and Table 7.5 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 5. As discussed in Section 7.3.5 and Table 7.5, ARARs 2-4, 50A, 58, 59 and 60 are designated "Not Germane" since this alternative does not contain a ground water treatment program or the use of emulsified asphalt. Except for the ARARs that have been designated Not Germane, the remaining ARARs will be complied with in Alternative 5.
- **Long-Term Effectiveness and Permanence**:
  - Alternative 5 would provide adequate long-term effectiveness and permanence, as long as OM&M activities are properly carried out and institutional controls (Tables 5.10 and 7.18) are maintained. Institutional controls that protect the long-term integrity of the remedy components, such as restricting penetrations of the cap, are particularly important for assuring long-term effectiveness and permanence. Hazardous waste caps have been shown to be highly effective for providing a barrier to contact with wastes, controlling infiltration of surface water and controlling migration of soil gas at numerous sites. As shown in the TM No. 13 Treatability Study, the reservoir LCPs would provide long-term effectiveness and permanence for removal of reservoir liquids.
  - Excavation of buried wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2 with consolidation under a RCRA-equivalent cap would further improve the long-term effectiveness and permanence of this alternative by placing the waste under a RCRA-equivalent cap. The total area underlain by waste materials would be reduced. This would result in better containment of the waste, reduction of the potential for migration to the ground water and improved control of soil gas migration, thus improving protection of human health and the environment.
  - Operation of the soil gas collection layer in a RCRA-equivalent cap, excavation of buried wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2 and operation of perimeter bioventing wells would achieve long-term effectiveness and permanence by reducing the soil gas levels, decreasing methane generation and degrading some portion of the subsurface petroleum hydrocarbons. However, data is not available to predict the level of degradation that would occur or the length of time it may require.
  - Since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, ground water monitoring will provide a level of long-term effectiveness and permanence by providing a warning should COCs at the Site begin migrating to ground water. In addition, the long-term effectiveness and permanence for removal of reservoir liquids and soil gas would improve protection of ground water.

- **Reduction of TMV**:
  - Excavation of buried wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2 with consolidation under a RCRA-equivalent cap would not result in a reduction in toxicity or volume of the wastes. It may result in a reduction in mobility since the waste would be consolidated over the concrete in the bottom of the reservoir. However, the condition of the concrete is not well known.
  - Placement of the cap in Alternative 5 would reduce mobility of the waste by providing containment, reducing infiltration of surface water and controlling migration of soil gas. Alternative 5 would achieve a reduction in TMV through the removal and treatment of soil gas and reservoir liquids. In addition, the perimeter bioventing wells would promote degradation of a portion of the waste mass.
- **Short-Term Effectiveness**:
  - During implementation of Alternative 5, a significant increase in short-term risks could be observed due primarily to excavation of buried wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2. Potential increases in short-term exposures to COCs could also occur during grading for the cap, and construction of the LCPs and passive bioventing wells. While these risks can be mitigated to a level protective of human health and the environment it may require advanced VOC, odor and particulate controls, such as the use of a dome over the excavation.
- **Implementability**:
  - The remediation technologies included in Alternative 5 are implementable using relatively standard construction procedures. RCRA-equivalent and monofill caps have been successfully constructed at numerous sites. Cap construction techniques are documented in guidance manuals, building codes and engineering text books. There are sufficient number of contractors possessing suitable cap construction experience doing business in the Site area to assure that Alternative 5 can be readily implemented. Similar conditions exist for the other components of Alternative 5.
  - Institutional controls (Tables 5.10 and 7.18) are implementable through existing regulatory mechanisms and private negotiations between PRPs and landowners, as described in Section 5.1.2.
- **Cost**:
  - Total costs associated with Alternative 5 are estimated to be $7,649,255. This includes capital costs for construction of a RCRA-equivalent cap, monofill cap, excavation of buried wastes from adjacent to buildings in Areas 5, 8 and the west corner of Area 2 with consolidation under the RCRA-equivalent cap, reservoir LCPs and soil gas engineering controls. The cost also includes present day costs for long-term operation, maintenance and monitoring.

7.4.6 ALTERNATIVE 6 - RCRA-EQUIVALENT CAP OVER AREA 2 INCLUDING THE RESERVOIR; EXCAVATION/CONSOLIDATION OF BURIED WASTE FROM AREAS 1, 4, 5, 6, 7, 8 AND WEST CORNER OF AREA 2; RESERVOIR LCPs; SOIL GAS ENGINEERING CONTROLS; GROUND WATER MONITORING; AND INSTITUTIONAL CONTROLS

1. This alternative incorporates a RCRA-equivalent cap over Area 2, including the reservoir, to provide containment for buried waste and serve as a continuous physical barrier. A total of approximately 594,000 ft^2 of area would be covered by the RCRA-equivalent cap. This cap would consist of, from the top down:

   - A 2-foot-thick vegetative layer.
   - A single-sided geocomposite drainage layer.
   - A 60-mil-thick HDPE geomembrane barrier layer.
   - A single-sided geocomposite gas collection layer.
   - A foundation layer (approximately 2 feet thick).

   The amount of waste material excavated and moved to Area 2 under this alternative is greater than under Alternatives 4 and 5. As a result, less import fill would be required to attain desired grades, making the capping costs slightly lower under this alternative.

2. Prior to construction of a RCRA-equivalent cap over Area 2, the waste material outside this area (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2), would be excavated and consolidated in Area 2. During excavation of wastes, some form of vapor control may be necessary. Based on the results of TM No. 12, it is anticipated that odor and VOC control for waste excavations performed in areas outside the reservoir can be effectively accomplished using water and foam vapor suppressant sprays. If waste excavations are performed inside of the reservoir, more extensive means of odor and VOC control such as large domed enclosures maintained under negative air pressure may be necessary. Contingency costs are included in the remedial alternatives which include excavation to account for possible costs for vapor control (see Appendix B). The resulting excavations would be backfilled with clean, compacted fill material. Approximately 53,400 cubic yards (yd^3) of waste material would be excavated and consolidated into Area 2. This may eliminate the need for certain institutional controls (Tables 5.10 and 7.18), such as access limitations and building modifications in the excavated areas.

3. Similar to Alternative 2, the gas collection system beneath the RCRA-equivalent cap would initially be operated as an active system. In time, it is anticipated that gas volumes will be low enough that the blower could be turned off and the system run as a passive system. Collected gases would be treated by an appropriate technology, such as carbon adsorption.

4. As indicated in Table 7.9, this alternative would also include reservoir LCPs, passive bioventing wells along portions of the perimeter of buried waste. The engineering controls may consist of: sealing penetrations in the floor slabs; installation of passive or active gas venting systems below floor slabs; installation of positive pressure heating, ventilation and air conditioning improvements; or some combination of these controls as discussed in Sections 5.5 and 6.1.5.

5. Institutional controls would be used to protect human health at the Site by preventing exposure to buried waste through implementation of restrictions on use of property by owners via: (1) the recordation of restrictive environmental easements; (2) implementation of local governmental land use or zoning restrictions; (3) restrictive physical access to property by controls such as signage. Institutional controls to be considered for the Site are listed in Tables 5.10 and 7.18.

6. The cost estimate for this alternative is presented in Table 7.15. As discussed in Alternative 4, excavation of buried waste at the Site may present a number of issues and potential contingency costs. Therefore, a contingency factor of 50 percent has been added to this alternative. The cost estimate presented in Table 7.15 is based on onsite disposal of the excavated wastes. If the excavated wastes were taken offsite for disposal, the costs presented in Table 7.15 would increase by approximately $15,100,000.

7. Figure 7.13 shows the general location of the various remedial components for Alternative 6.

8. Evaluation of Alternative 6 by the NCP criteria is as follows:
   - **Overall Protection of Human Health and Environment**:
     - Construction of the RCRA-equivalent cap would provide a barrier for exposure to the underlying waste materials. This barrier function, along with the institutional controls (e.g., restricting future site uses that could affect the integrity of the cap, not allowing planting of deep-rooting plants in capped areas and other institutional controls shown in Tables 5.10 and 7.18), would effectively mitigate potential impacts to a level that is protective of human health and the environment from solid wastes. In addition, excavation of buried wastes from outside Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2) with consolidation under the RCRA-equivalent cap, would increase the overall level of protection of human health and the environment by reducing the area underlain by waste materials.
     - The cap would reduce infiltration of surface water, thus decreasing the potential for future migration of waste to ground water. The combination of the reduced infiltration and the reservoir LCPs

described in Section 6.1.3 would effectively mitigate potential impacts to a level that is protective of human health and the environment from reservoir liquids.

- The RCRA-equivalent cap would provide a horizontal barrier for the control of soil gas. The gas barrier in the RCRA-equivalent cap, in combination with the excavation of buried wastes from outside Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2) and perimeter bioventing wells, would effectively mitigate potential impacts to a level that is protective of human health and the environment from soil gas.
- Ground water is addressed in a separate alternative, as such, Alternative 6 includes only ground water monitoring. Implementation of ground water monitoring as part of Alternative 6 would provide improved protection of human health and the environment in that it will provide an early warning should COCs begin migrating to the ground water. In addition, the reduction of potential impacts to ground water due to reservoir liquids and soil gas resulting from Alternative 6 would also be protective of human health and the environment.

- **Compliance With ARARs**:
  - Section 7.3.6 and Table 7.6 provide a summary of the ARARs that are applicable, relevant and appropriate as well as those that are not germane to Alternative 6. As discussed in Section 7.3.6 and Table 7.6, ARARs 2-4, 50A, 58, 59 and 60 are designated "Not Germane" since this alternative does not contain a ground water treatment program or the use of emulsified asphalt. Except for the ARARs that have been designated Not Germane, the remaining ARARs will be complied with in Alternative 6.
  - Alternative 6 would provide adequate long-term effectiveness and permanence, as long as OM&M activities are properly carried out and institutional controls (Tables 5.10 and 7.18) are maintained. Institutional controls that protect the long-term integrity of the remedy components, such as restricting penetrations of the cap, are particularly important for assuring long-term effectiveness and permanence. Hazardous waste caps have been shown to be highly effective for providing a barrier to contact with wastes, controlling infiltration of surface water and controlling migration of soil gas at numerous sites. As shown in the TM No. 13 Treatability Study, reservoir LCPs would provide long-term effectiveness and permanence for removal of reservoir liquids.
  - Excavation of buried wastes from outside Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2) with consolidation under the RCRA-equivalent cap would further improve the long-term effectiveness and permanence of this alternative by placing the waste under a RCRA-equivalent cap. The total area underlain by waste materials would be reduced. This would result in better containment of the waste, reduction of the potential for migration to the ground water and improved control of soil gas migration, thus improving protection of human health and the environment.
  - Operation of the soil gas collection layer in the RCRA-equivalent cap, excavation of buried wastes from outside Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2) and operation of the perimeter

bioventing wells would achieve long-term effectiveness and permanence by reducing the soil gas levels, decreasing methane generation and degrading some portion of the subsurface petroleum hydrocarbons. However, data is not available to predict the level of degradation that would occur or the length of time it may require.

  - Since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, ground water monitoring will provide a level of long-term effectiveness and permanence by providing a warning should COCs at the Site begin migrating to ground water. In addition, the long-term effectiveness and permanence of removal of reservoir liquids and soil gas would improve protection of ground water.

- **Reduction of TMV**:
  - Although excavation of buried wastes from outside Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2) with consolidation under the RCRA-equivalent cap would not result in a reduction in toxicity or volume of the wastes, it may result in a decrease in mobility since the waste would be consolidated over the concrete in the bottom of the reservoir. However, the condition of the concrete is not well known.
  - Placement of the cap in Alternative 6 would reduce the mobility of the waste by providing containment, reducing infiltration of surface water and controlling migration of soil gas. Alternative 6 would achieve a reduction in TMV through the removal and treatment of soil gas and reservoir liquids. In addition, the perimeter bioventing wells would promote degradation of a portion of the waste mass.

- **Short-Term Effectiveness**:
  - During implementation of Alternative 6, a significant increase in short-term risks would be observed due primarily to excavation of buried waste from outside Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2). Potential increases in short-term exposures to COCs could also occur during grading for the cap, and construction of the LCPs and passive bioventing wells. While these risks can be mitigated to a level protective of human health and the environment, it may require advanced VOC, odor and particulate controls, such as the use of a dome over the excavation.

- **Implementability**:
  - The remediation technologies included in Alternative 6 are implementable using relatively standard construction procedures. RCRA-equivalent and monofill caps have been successfully constructed at numerous sites. Cap construction techniques are documented in guidance manuals, building codes and engineering text books. There are a sufficient number of contractors possessing suitable cap construction experience doing business in the Site area to assure that Alternative 6 can be readily implemented. Similar conditions exist for the other components of Alternative 6.
  - Institutional controls (Tables 5.10 and 7.18) are implementable through existing regulatory mechanisms and private negotiations between PRPs and landowners, as described in Section 5.1.2.

- **Cost**:
  - Total costs associated with Alternative 6 are estimated to be $12,049,521. This includes capital costs for construction of the RCRA-equivalent cap, excavation of buried wastes from outside Area 2 (Areas 1, 4, 5, 6, 7, 8 and the west corner of Area 2) with consolidation under the RCRA-equivalent cap, reservoir LCPs and soil gas engineering controls. The cost also includes present day costs for long-term operation, maintenance and monitoring.

7.4.7 ALTERNATIVE 7 - GROUND WATER MONITORING

1. As requested by EPA, ground water monitoring is addressed as a separate alternative. Under this alternative the current Site ground water monitoring program would be continued. Since this alternative addresses only ground water, its analysis by the NCP criteria is done from the aspect of ground water only.

2. The cost estimate for this alternative is presented in Table 7.16.

3. Evaluation of Alternative 7 by the NCP criteria is as follows:
   - **Overall Protection of Human Health and Environment**:
     - Current indications are that the Site has not contributed to regional ground water contamination. In addition, ground water COC levels are currently below health based risk levels. Hence, the ground water monitoring alternative is currently protective of human health and the environment. In the event the Site does begin to have an impact on ground water, Alternative 7 would provide a level of protection of human health and the environment by providing a warning of the changing ground water conditions.
   - **Compliance with ARARs**:
     - Section 7.3.7 and Table 7.7 provide a summary of the ARARs that are applicable, relevant and appropriate, as well as those that are not germane to Alternative 7. As discussed in Section 7.3.7, the ARARs germane to this alternative include ARARs 2-4, 47 and 48. Alternative 7 will not comply with ARARs 2-4 as it only provides for the ground water monitoring portion and does not include treatment. This alternative does comply with ARARs 47 and 48. Ground water monitoring as a separate alternative will not comply with all of the germane ARARs.
   - **Long-Term Effectiveness and Permanence**:
     - Since current indications are that the Site has not contributed to regional ground water contamination and ground water COC levels are currently below health based risk levels, Alternative 7 will provide long-term effectiveness and permanence. Should

current conditions change and the Site begins to impact the ground water, this alternative would not provide long-term effectiveness and permanence.

- **Reduction of TMV**:
  - Alternative 7 does not provide a reduction of TMV.
- **Short-Term Effectiveness**:
  - Since Alternative 7 is a continuation of the current ground water monitoring program at the Site, there would be no changes to the current Site conditions. Increased short-term effects or exposure would not occur to onsite workers or the community during implementation of Alternative 7.
- **Implementability**:
  - Since Alternative 7 is a continuation of the current ground water monitoring program at the Site, it has already been implemented.
- **Cost**:
  - Total costs associated with Alternative 7 are $629,155. These costs are related to the continued ground water monitoring and reporting that would be included under this alternative. A cost summary is presented in Table 7.16. A detailed cost analysis is presented in Appendix B.

7.4.8 ALTERNATIVE 8 - GROUND WATER EXTRACTION AND TREATMENT

1. As requested by EPA, ground water extraction and treatment is addressed as a separate alternative.

2. A series of up to 14 ground water extraction wells would be constructed in the northwestern approximately one-quarter of the Site to remove contaminated ground water. The actual number of wells and locations would be determined by additional studies such as pump testing. A series of up to nine treated water injection wells would be constructed along the perimeter of the Site beside Santa Fe Springs Road and Los Nietos Road. Treated ground water would be injected into these wells to establish a hydraulic barrier along the downgradient sides of the Site. Extracted ground water would be conveyed via underground double-wall pipelines to a central treatment plant. Contaminated ground water would be treated using granular activated carbon to remove chlorinated hydrocarbons to below MCLs.

3. The cost estimate for this alternative is presented in Table 7.17.

4. Figure 7.7 shows the general location of the various remedial components for Alternative 7.

5. Evaluation of Alternative 8 by the NCP criteria is as follows:

- **Overall Protection of Human Health and Environment:**
  - Construction and operation of the ground water extraction and treatment system would have no effect on buried wastes and soil gas.
  - Implementation of ground water extraction and treatment would provide limited improvement for protection of human health and the environment, since ground water COC levels are below health based risk levels. In addition, this alternative would be implemented along with one of Alternatives 2 to 6 discussed above. Implementation of one of the alternatives for addressing buried wastes, soil gas and liquids within and outside of the reservoir would also decrease the potential threat to ground water.
- **Compliance With ARARs:**
  - Section 7.3.7 and Table 7.8 provide a summary of the ARARs that are applicable, relevant and appropriate as well as those that are not germane to Alternative 8. As discussed in Section 7.3.7 and Table 7.8, ARARs 2-4 and 47-50A are germane to Alternative 8. The remaining ARARs are not germane to Alternative 8 as this alternative, if selected, will be combined with Alternatives 2-6, which do not contain a ground water treatment component. Alternative 8 will comply with the germane ARARs.
- **Long-Term Effectiveness and Permanence:**
  - Ground water extraction and treatment would provide long-term effectiveness and permanence. In addition, this alternative would be implemented along with one of Alternatives 2 to 6 discussed above. Long-term effectiveness and permanence of one of the alternatives for addressing soil gas and liquids within and outside of the reservoir would also reduce potential threat to ground water.
- **Reduction of TMV:**
  - Alternative 8 would achieve a reduction in TMV through the removal and treatment of contaminated ground water. However, since the source is offsite and cannot be treated, the reduction in TMV may not be expected to be very significant.
- **Short-Term Effectiveness:**
  - During implementation of Alternative 8, there may be some increase in short-term risks as a result of contaminated ground water being extracted during construction and operation of the extraction wells. However, these risks can be mitigated to a level that is protective of human health and the environment through application of appropriate waste management measures.
- **Implementability:**
  - The remediation technologies included in Alternative 8 are implementable using relatively standard construction procedures. Ground water extraction and treatment systems have been successfully constructed at numerous sites. Construction techniques are documented in guidance manuals, building codes and engineering text books. There are a sufficient number of contractors possessing suitable construction experience doing business in the Site area to assure that Alternative 8 can be readily implemented.

- Institutional controls (Tables 5.10 and 7.18) are implementable through existing regulatory mechanisms and private negotiations between PRPs and landowners, as described in Section 5.1.2.

- **Cost**:
  - Total costs associated with Alternative 8 are estimated to be $2,818,970. This includes capital costs for construction of the ground water extraction and treatment system. The cost also includes present day costs for long-term operation, maintenance and monitoring.

7.5 COMPARATIVE ANALYSIS

1. In the following analysis, remedial alternatives discussed in the previous section are evaluated in relation to one another for each of the NCP evaluation criteria. The purpose of this analysis is to identify the relative advantages and disadvantages of each alternative.

7.5.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

1. The alternatives, except Alternative 1 (No Further Action), provide adequate protection of human health and the environment. Alternative 7 would provide only limited protection if current conditions change and the Site begins to impact regional ground water.

2. Alternatives 2 through 6 include RCRA-equivalent caps and monofill caps in various combinations over different areas, LCPs and institutional controls. The most protective is Alternative 6, in which the wastes outside Area 2 are excavated and consolidated in Area 2. Hence, the RCRA-equivalent cap would cover all of the wastes. The next most protective for human health would be Alternative 5, under which waste would be excavated from adjacent to and beneath buildings in Areas 5, 8 and the west corner of Area 2. Although Alternative 4 would be less protective for human health than Alternative 5, it would be more protective of the environment as more of the wastes would be excavated and consolidated beneath the RCRA-equivalent cap. Alternatives 2 and 3 would be slightly less protective for human health and the environment, as they would leave wastes in place and construct caps over them. Alternative 3 is slightly more protective of human health than Alternative 2, as it includes SVE in noncompliance areas.

3. Alternative 8, ground water extraction and treatment, is somewhat more protective than Alternative 7, ground water monitoring. However, since concentrations of COCs in the ground water are below health risk based levels, the difference in the protectiveness between these two alternatives is slight.

4. Alternative 8, if combined with one of Alternatives 2 to 6, would be slightly more protective of the environment, as it includes extraction and treatment of ground water. However, since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, extraction and treatment would, at best, achieve a limited improvement.

7.5.2 COMPLIANCE WITH ARARs

1. Alternative 1 is the "No Further Action" alternative required by the NCP for comparison. Alternative 1 includes only ground water monitoring to document Site conditions. Alternative 1 does not comply with the ARARs as it does not contain remedial technologies to cleanup the Site and protect the environment. Alternatives 2 through 6 comply with the ARARs except for those ARARs designated not to be germane to a specific alternative. Alternative 7, ground water monitoring, as a separate alternative will not comply with all of the germane ARARs. Alternative 8 includes a pump and treat ground water program. This alternative complies with the ARARs for water quality. The remaining ARARs are not germane to Alternative 8 as this alternative, if selected, will be combined with one of Alternatives 2-6, which do not contain a ground water treatment component.

7.5.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

1. Alternatives 2 through 6 would provide adequate long-term effectiveness and permanence, as long as OM&M activities are properly carried out and institutional controls (Tables 5.10 and 7.18) are enforced. Alternative 6 would have an advantage over other alternatives because it has the smallest capped area. Similarly, Alternative 4 would have an advantage over Alternatives 2, 3 and 5 due to its smaller capped area. Alternative 5 would have an advantage over Alternatives 2 and 3 due to its smaller capped area.

2. Alternative 7, ground water monitoring, would not be as effective as Alternative 8, ground water extraction and treatment, if current conditions change and the Site begins to impact ground water. Alternative 8, if combined with one of Alternatives 2 to 6, would be a slightly

more protective than the other alternatives, as a result of including the ground water extraction and treatment system. However, since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, this advantage is minimal.

7.5.4 REDUCTION OF TMV

1. Alternatives 5, 4 and 6 (in increasing order) may reduce the mobility of the waste due to consolidation of some of the waste within the reservoir, the bottom of which is covered by concrete. However, the condition of the concrete is unknown.

2. Alternatives 2 through 6 would equally achieve reductions in TMV through the extraction and treatment of soil gas and reservoir liquids.

3. Alternative 8 would have an advantage over Alternative 7 in reduction of TMV. Alternative 8, if combined with one of Alternatives 2 to 6, would have a slight advantage over the other alternatives as a result of extraction and treatment of ground water. However, since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risks, this advantage is minimal.

7.5.5 SHORT-TERM EFFECTIVENESS

1. Alternatives 2 and 3 would have an advantage over Alternatives 4, 5 and 6 in short-term effectiveness, as they would cause less disturbance of contaminated media. Although less disturbance of waste would occur in Alternative 5 than Alternative 4; the latter alternative is still considered to have an advantage in short-term effectiveness over Alternative 5. In Alternative 5, excavations of waste would occur immediately adjacent to and beneath buildings, whereas, excavations done under Alternative 4 would be some distance away from existing buildings. Alternative 6 would cause the most disturbance of waste; hence, it would have lowest short-term effectiveness.

2. Alternative 7 would have an advantage over Alternative 8. Alternative 7 would require no construction at the Site. In addition, Alternative 8 would entail long-term extraction and handling of large quantities of contaminated ground water, while Alternative 7 would require extraction of only small quantities during monitoring well purging and sampling activities.

7.5.6 IMPLEMENTABILITY

1. While Alternatives 2 to 6 include construction of a cap with significant materials handling requirements, the necessary materials are locally available and construction methods are relatively standard. Alternative 6 has an advantage over Alternatives 2 to 5 in that the size of the cap to be constructed is smallest for this alternative.

2. From an overall implementability standpoint, Alternative 3 would be the simplest to construct and operate because it would involve the fewest components. Alternative 2 would be the next simplest to construct and operate. However, because Alternative 2 would involve modifications to existing buildings, the implementation and operation of which would impact the building tenants, this is a disadvantage to Alternative 3.

3. Alternatives 4 through 6 have the disadvantage of excavating and transporting waste materials. Alternative 6 would have the greatest disadvantage because it would involve excavation of the largest amount of waste of the alternatives. Although Alternative 5 would involve less excavation of waste than Alternative 4, it is considered to be at a disadvantage to Alternative 4 because the excavations would be made adjacent to and beneath existing buildings.

4. Alternative 7 would have a significant advantage in implementability over Alternative 8. Alternative 7 would be the continuation of the existing ground water monitoring program. Hence, little to no construction is necessary to implement Alternative 7. In addition to the additional construction activities associated with installation of wells and pipelines for Alternative 8, it would also include significant operation requirements. Additional site investigation work would be required to design the ground water extraction and treatment system. Alternative 8 would add complexity to whichever of Alternatives 2 to 6 that it is combined with.

7.5.7 COST

1. Alternative 1 has the lowest present worth cost ($629,155), which is for long-term ground water monitoring.

2. Although Alternative 7 has the same cost as Alternative 1 ($629,155), it only considers ground water monitoring and would be combined with one of Alternatives 2 to 6.

3. Alternative 8 has the third lowest present worth cost ($2,818,970). However, it only considers ground water and would be combined with one of Alternatives 2 to 6. Since the Site has not contributed to regional ground water contamination and COC levels are currently below health based risk levels, Alternative 8 is not considered to be cost-effective.

4. Alternative 2 has the next lowest present worth cost ($6,958,918). However, the OM&M costs for Alternatives 2, 3, 4 and 5 are grouped in a relatively tight range ($4,525,837, $4,910,647, $4,915,216 and $4,370,402, respectively). This is because these four alternatives leave the Site in a similar condition as far as OM&M requirements. The present worth cost of Alternative 3 ($10,442,274) is greater than Alternative 4 ($9,673,448) and Alternative 5 ($7,649,255), primarily due to the greater amount of asphalt paving which is included in Alternative 3.

5. The present worth cost of Alternative 6 ($12,049,521) is dramatically greater than the other alternatives. This is a result of the much greater waste excavation costs associated with this alternative.

6. The costs of the alternatives are summarized in Tables 7.10 through 7.17, and details are included in Appendix B.

7.5.8 STATE ACCEPTANCE

1. This criterion will be addressed by EPA in the ROD, once state comments are received on the SFS and proposed plan.

7.5.9 COMMUNITY ACCEPTANCE

1. This criterion will be addressed by EPA in the ROD, once public comments are received on the SFS and proposed plan.

7.6 SUMMARY

1. The screened remedial technologies and process options from Chapters 5.0 and 6.0 have been assembled into site-wide remedial alternatives. An effort has been made to show a representative range of the many possible combinations of remedial technologies and process options. The components of each remedial alternative are summarized in Table 7.9.

2. Cost estimates were prepared for the remedial alternatives. These include capital costs and present value of OM&M. Cost estimates for each alternative are presented in Tables 7.10 through 7.17. A detailed cost analysis is provided in Appendix B.

3. Each of the remedial alternatives were evaluated based on the NCP criteria. A comparative analysis was then performed to identify the relative advantages and disadvantages of each alternative.

4. The information presented herein will be used by EPA to develop the proposed plan for the Site, and to issue a new ROD. This process will include state and public involvement in the remedy selection.

TABLE 7.9

SUMMARY OF SITE-WIDE ALTERNATIVES 1 THROUGH 6
WASTE DISPOSAL, INC. SUPERFUND SITE

ALTERNATIVE	NO FURTHER ACTION	INSTITUTIONAL CONTROLS: Deed Restriction	INSTITUTIONAL CONTROLS: Access Agreements	INSTITUTIONAL CONTROLS: Further Building/Development Requirements	MONITORING: Ground Water	MONITORING: Reservoir Liquids	MONITORING: Area Liquids	MONITORING: Air: Interior	MONITORING: Air: Exterior	MONITORING: Soil Gas: Perimeter	MONITORING: Soil Gas: Buildings	MEDIA AREAS: SOILS: CONTAINMENT: Cap Buried Waste: Over Reservoir: RCRA or RCRA Equivalent	MEDIA AREAS: SOILS: CONTAINMENT: Cap Buried Waste: Over Reservoir: Monofill (RCRA-Equivalent)	MEDIA AREAS: SOILS: CONTAINMENT: Cap Buried Waste: Outside Reservoir: Asphalt	MEDIA AREAS: SOILS: CONTAINMENT: Cap Buried Waste: Outside Reservoir: Monofill (Soil)	MEDIA AREAS: SOILS: CONTAINMENT: Cap Buried Waste: Outside Reservoir: Monofill (RCRA-Equivalent)	MEDIA AREAS: SOILS: EXCAVATION: Dispose On-Site Under Cap in Reservoir Area	MEDIA AREAS: SOILS: EXCAVATION: Treat & Dispose Offsite: Thermal Desorption	MEDIA AREAS: SOILS: EXCAVATION: Treat & Dispose Offsite: Incineration	MEDIA AREAS: SOIL GAS: CONTAINMENT: Active Engineering Controls: Areas Outside of Cement-Clad Buried Reservoir: SVE Collection Wells w/ Thermal Treatment; design integrated w/ cap	MEDIA AREAS: SOIL GAS: CONTAINMENT: Active Engineering Controls: Areas Outside of Cement-Clad Buried Reservoir: Excavation/ Backfill; vertical & horizontal barriers; design integrated w/ cap	MEDIA AREAS: SOIL GAS: CONTAINMENT: Active Engineering Controls: Areas Outside of Cement-Clad Buried Reservoir: Vertical & Horizontal Barriers; design integrated w/ cap	MEDIA AREAS: SOIL GAS: TREATMENT: Active: Within Reservoir: SVE System w/ Thermal Treatment; design integrated w/ cap	MEDIA AREAS: SOIL GAS: TREATMENT: Active: Outside Reservoir: SVE System w/ Thermal Treatment; design integrated w/ cap	MEDIA AREAS: SOIL GAS: TREATMENT: Passive: Within Reservoir: Pipe Venting; design integrated w/ cap	MEDIA AREAS: SOIL GAS: TREATMENT: Passive: Outside Reservoir: Bio-Venting w/ Barrier System	MEDIA AREAS: INDOOR AIR: CONTAINMENT/ BARRIER SYSTEM: Engineering Controls/Building Modifications: Passive: Floor Sealing	MEDIA AREAS: INDOOR AIR: CONTAINMENT/ BARRIER SYSTEM: Engineering Controls/Building Modifications: Active: Foundation Venting	MEDIA AREAS: INDOOR AIR: CONTAINMENT/ BARRIER SYSTEM: Engineering Controls/Building Modifications: Active: Positive Bldg. Pressure	MEDIA AREAS: LIQUIDS: EXTRACTION/ TREATMENT: Reservoir Liquids: Vertical wells, horizontal wells, trenching	MEDIA AREAS: LIQUIDS: EXTRACTION/ TREATMENT: Area Liquids: Vertical wells, horizontal wells, SVE collection
Alternative 1 - No Further Action	X				X																										
Alternative 2 - Building, Modifications[1], RCRA-equiv.[1] monofill[1] cap over reservoir; monofill over rest of buried waste; reservoir liquids removal/control (RLR/C)[6]; institutional controls (ICs)[7]		X	X	X	X	X	X	X		X	X		X		X										X			X	X	X	X
Alternative 3 - SVE[4] in Non-Compliance Areas; RCRA-equiv. asphalt[3] cap over reservoir and rest of buried waste; RLRC/C; ICs[7]		X	X	X	X	X	X	X		X	X[1]	X		X									X	X						X	X
Alternative 4 - Limited Waste Excavation[9]; RCRA-equiv. cap over reservoir; SVE[4] in non-compliance areas; building modification[1]; bioventing or barrier systems; RLR/C[4]; ICs[7]		X	X	X	X	X	X	X	X[7]	X		X				X	X	X	X	X	X	X								X	X
Alternative 5 - Excavation of Waste Adjacent/Under Onsite Buildings[1&9]; RCRA-equiv. cap over reservoir; monofill or asphalt over waste; bioventing or barrier systems; RLR/C[4]; ICs[7]		X	X	X	X	X	X	X	X[1]	X	X	X			X		X	X	X		X	X	X			X				X	X
Alternative 6 - Full Waste Excavation Except Area 2[9]; RCRA-equiv. cap over reservoir; monofill or asphalt over rest of waste; bioventing or barrier systems; RLR/C[4]; ICs[7]		X	X	X	X	X	X	X	X	X		X			X		X	X	X		X	X	X			X				X	X

94-256/Rpts/SFS Rev. 2.0 (7/24/00/jb)

TABLE 7.9

SUMMARY OF SITE-WIDE ALTERNATIVES 1 THROUGH 6
WASTE DISPOSAL, INC. SUPERFUND SITE
(Continued)

Footnotes:

1. Building Modifications for soil gas control could include: sealing the floors, installing a venting system below the foundation, applying positive pressure to the building (e.g., air conditioning) and/or building monitoring, with an alarm system and ventilation controls. The specific details will be determined by EPA, based on comments on the Proposed Plan, when EPA selects the remedy in the ROD.

2. Capping assumptions are based on EPA's "Presumptive Remedy for Landfills" and State ARARs for landfill closure. The RCRA-equivalent cap would consist of an engineered system of geosynthetic and earthen materials designed to prevent direct exposure to buried waste, to control surface water infiltration, and to reduce the mobility of contaminants to groundwater. The RCRA-equivalent cap would include components for liquids removal and monitoring, gas control and treatment, and surface water drainage control.

3. The Monofill cap would typically consist of 1-2 feet of soil materials that meet State landfill closure requirements and is designed to prevent direct exposure to buried waste, to control surface water infiltration and to reduce the mobility of contaminants to ground water. If the existing soil cover does not meet the State's standards, then the monofill cap will be re-engineered with clean fill material.

4. Building Monitoring needed, if SVE system is not capable of reducing the concentrations in the soil vapor monitoring wells adjacent to buildings to levels below EPAs ROD soil gas standards.

5. The Asphalt cap would typically consist of 8-14 inches (including aggregate base) of asphalt material that is designed to prevent direct exposure to buried waste, to control surface water infiltration and to reduce the mobility of contaminants to ground water. To reduce erosion potential, edge details will be considered for surface flow runoff control if the asphalt cap abuts areas of monofill cover.

6. Reservoir Liquids Removal/Control would be an integral component of any capping alternative. Alternatives could include continued removal of liquids until cap is installed, followed by continued monitoring and control of liquids through ongoing removal by a series of reservoir leachate collection sumps or liquids recovery wells. Installation and management of liquids removal/control system would be designed in conjunction with the capping of the buried waste.

7. Institutional Controls (ICs) would include some or all of the following: ground water and soil gas monitoring; future deed restrictions and access agreements for all parcels; building construction requirements for all future development; excavation, and ground water and ground water extraction restrictions, and other controls. ICs would be an integral component of any selected capping alternative and any other alternative leaving buried wastes in place.

8. Subsurface soil gas monitoring needed adjacent to buildings unless sufficient postexcavation subsurface soil gas building monitoring and in-building air monitoring is conducted to show no migration. Perimeter soil gas monitoring would be required.

9. During excavation of buried waste, exterior (outdoor) air monitoring needed, in addition to tenting of excavation area and/or odor/emission suppressants to control releases of volatile organic compounds (VOCs) and odors.

TABLE 7.10

ALTERNATIVE 1 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
No Capital Costs	0
Los Angeles City Cost Index (5.1%)	0
Subtotal	0
Engineering, Permitting, Construction Management, Monitoring (25%)	0
Subtotal	0
Present-Worth O&M Costs	629
TOTAL COST	**629**

94-256/Rpts/SFS Rev. 2.0 (7/24/00/jb)

TABLE 7.11

ALTERNATIVE 2 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
Capital Costs	
• RCRA-Equivalent Cap Over Reservoir	662
• Soil Gas Control Beneath RCRA-Equivalent Cap	22
• Monofill (Soil) Cap Area 2	342
• Monofill (Soil) Cap Outside Area 2	120
• Paved Areas To Be Repaired/Upgraded Outside Of Area 2	38
• Reservoir Liquid/Leachate Monitoring	3
• Perimeter Passive Gas Control System	83
• Contractor Mobilization/Demobilization	25
• Surface Water Controls	27
• Stormwater Management	8
• Building Engineering Controls	140
Subtotal	1,470
Los Angeles City Cost Index (5.1%)	75
Subtotal	1,545
Engineering, Permitting, Construction Management, Monitoring (25%)	387
Institutional Controls	500
Subtotal	2,432
Present-Worth OM&M Costs	4,526
TOTAL COST	**6,958**

94-256/Rpts/SFS Rev. 2.0 (7/25/00/rm)

TABLE 7.12

ALTERNATIVE 3 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
Capital Costs	
• RCRA-Equivalent Asphalt Cap Over Reservoir	1,561
• Soil Gas Control Beneath Asphalt Cap	22
• Asphalt Cap Over Area 2 (Not Including Reservoir)	1,332
• Soil Gas Control Beneath Asphalt Cap	23
• Asphalt Cap in Selected Portions Outside Area 2	323
• Paved Areas to be Repaired/Upgraded Outside Area 2	38
• Reservoir Liquid/Leachate Monitoring	3
• Perimeter Passive Gas Control System	83
• Soil Vapor Extraction Systems in Noncompliant Areas (Areas 5, 7 and 8)	250
• Contractor Mobilization/Demobilization	19
• Surface Water Controls	27
• Stormwater Management	8
• Building Engineering Controls	140
Subtotal	3,829
Los Angeles City Cost Index (5.1%)	195
Subtotal	4,024
Engineering, Permitting, Construction Management, Monitoring (25%)	1,006
Institutional Controls	500
Subtotal	5,530
Present Worth OM&M Costs	4,911
TOTAL COST	**10,441**

94-256/Rpts/SFS Rev. 2.0 (7/25/00/rm)

TABLE 7.13

ALTERNATIVE 4 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
Capital Costs	
• RCRA-Equivalent Cap Over Reservoir Area	662
• Soil Gas Control Beneath RCRA-Equivalent Cap	22
• Excavate Waste in Areas 1, 6 And 8 with Consolidation in Reservoir	1,578
• Monofill (Soil) Cap in Area 2 (Not Including Reservoir)	342
• Monofill (Soil) Cap in Selected Areas Outside Area 2 (Areas 4, 5 and 7)	75
• Paved Areas To Be Repaired/Upgraded Outside Of Area 2 (Areas 4, 5 and 7)	16
• Reservoir Liquid/Leachate Monitoring	3
• Perimeter Passive Gas Control System	83
• Soil Vapor Extraction System in Noncompliance Areas (Areas 5, 7 and 8)	250
• Contractor Mobilization/Demobilization	25
• Surface Water Controls	27
• Stormwater Management	17
• Building Engineering Controls	140
Subtotal	3,240
Los Angeles City Cost Index (5.1%)	165
Subtotal	3,405
Engineering, Permitting, Construction Management, Monitoring (25%)	852
Institutional Controls	500
Subtotal	4,757
Present-Worth OM&M Costs	4,915
TOTAL COST	**9,672**

94-256/Rpts/SFS Rev. 2.0 (7/25/00/rm)

TABLE 7.14

ALTERNATIVE 5 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
Capital Costs	
• RCRA-Equivalent Cap Over Reservoir Area	1,141
• Soil Gas Control Beneath RCRA-Equivalent Cap	22
• Excavate Waste Adjacent to Buildings with Consolidation in Reservoir	151
• Monofill (Soil) Cap in Area 2 (Not Including Reservoir)	342
• Monofill (Soil) Cap in Selected Portions of Areas 4, 5 and 7	69
• Monofill (Soil) Cap in Areas 1, 6 and 8	42
• Paved Areas to be Repaired/Upgraded in Areas 1, 4, 5, 6, 7 and 8	39
• Reservoir Liquid/Leachate Monitoring	3
• Perimeter Passive Gas Control System	97
• Contractor Mobilization/Demobilization	25
• Surface Water Controls	27
• Stormwater Management	17
• Building Engineering Controls	140
Subtotal	2,115
Los Angeles City Cost Index (5.1%)	108
Subtotal	2,223
Engineering, Permitting, Construction Management, Monitoring (25%)	556
Institutional Controls	500
Subtotal	3,279
Present-Worth OM&M Costs	4,370
TOTAL COST	**7,649**

94-256/Rpts/SFS Rev. 2.0 (7/25/00)(rm)

TABLE 7.15

ALTERNATIVE 6 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
Capital Costs	
• RCRA-Equivalent Cap Over Reservoir Area	1,169
• Soil Gas Control Beneath RCRA-Equivalent Cap	22
• Excavate Waste from Areas 1, 4, 5, 6, 7, 8 and west corner of Area 2	4,251
• Reservoir Liquid/Leachate Monitoring	3
• Perimeter Passive Gas Control System	73
• Contractor Mobilization/Demobilization	5
• Surface Water Controls	27
• Stormwater Management	13
Subtotal	5,588
Los Angeles City Cost Index (5.1%)	285
Subtotal	5,868
Engineering, Permitting, Construction Management, Monitoring (25%)	1,467
Institutional Controls	500
Subtotal	7,835
Present-Worth OM&M Costs	4,214
TOTAL COST	**12,049**

94-256/Rpts/SFS Rev. 2.0 (7/25/00/rm)

TABLE 7.16

ALTERNATIVE 7 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
No Capital Costs	0
Los Angeles City Cost Index (5.1%)	0
Subtotal	0
Engineering, Permitting, Construction Management, Monitoring (25%)	0
Subtotal	0
Present-Worth OM&M Costs	629
TOTAL COST	**629**

94-256/Rpts/SFS Rev. 2.0 (7/25/00/rm)

TABLE 7.17

ALTERNATIVE 8 COST SUMMARY
WASTE DISPOSAL, INC. SUPERFUND SITE

DESCRIPTION	TOTAL COST ($ thousand)
Capital Costs • Pump and Treat Ground Water System	1,165
Los Angeles City Cost Index (5.1%)	59
Subtotal	1,224
Engineering, Permitting, Construction Management, Monitoring (25%)	306
Subtotal	1,530
Present-Worth OM&M Costs	1,288
TOTAL COST	**2,818**

94-256/Rpts/SFS Rev 2.0 (7/25/00/rm)

TABLE 7.18

APPLICABLE INSTITUTIONAL CONTROLS BY SITE AREA AND REMEDIAL ALTERNATIVE WASTE DISPOSAL, INC. SUPERFUND SITE

REMEDIAL ALTERNATIVES[1]	APPLICABLE INSTITUTIONAL CONTROLS							
	Area 1	Area 2	Area 3	Area 4	Area 5	Area 6	Area 7	Area 8
1. No Action								
2. RCRA-Equivalent Cap	●	●	❍	●	●	●	●	●
3. RCRA-Equivalent Asphalt Cap	●	●	❍	●	●	●	●	●
4. Limited Waste Excavation	⊕	●	❍	●	●	⊕	●	⊕
5. Excavation of Waste Adjacent/Beneath Buildings	●	●	❍	●	●	●	●	●
6. Full Waste Excavation Except for Site Area 2	⊕	●	❍	⊕	⊕	⊕	⊕	⊕

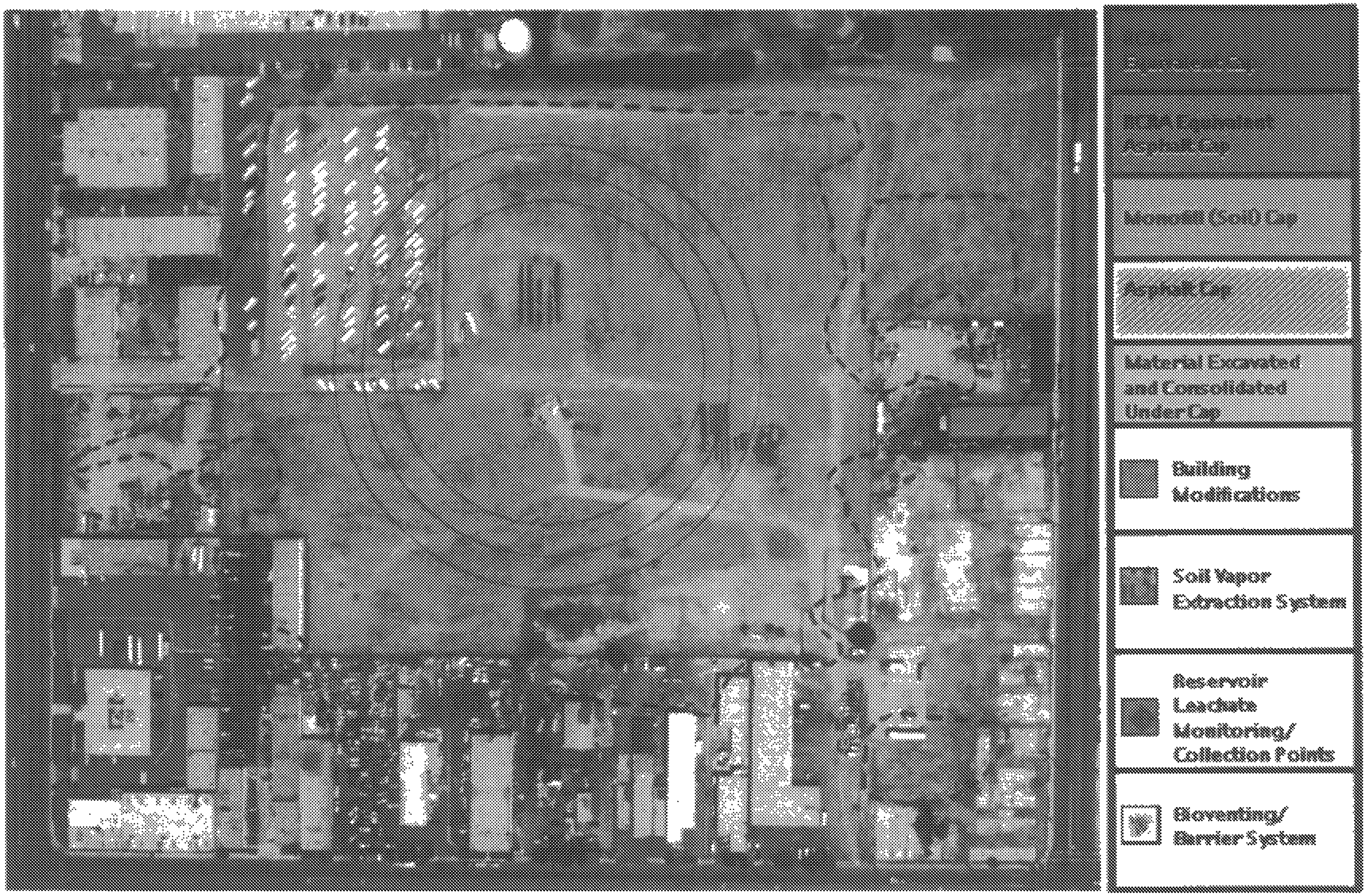
94-256/Rpts/SFS Rev. 2.0 (7/24/00/jb)

[1] Remedial Alternative 7: Ground Water Monitoring and Remedial Alternative 8: Ground Water Extraction and Treatment, if selected, would be implemented along with one of Remedial Alternatives 2 to 6. Institutional controls that would specifically apply to Remedial Alternative 7 are 1-3, 8, 17, 18 and 20-23. Institutional controls that would specifically apply to Remedial Alternative 8 are 1-3, 8 and 17-23.

● = Full set of institutional controls: Areas with waste remaining after Remedial Action.

⊕ = Subset 1 of institutional controls: Areas where waste has been removed. Institutional controls 1-3, 11-18, 20-23, 25, 28, 31-36.

❍ = Subset 2 of institutional controls: Areas with no evidence of waste. Institutional controls 1, 2, 11, 17, 18, 20-23, 25, 28, 31-36.



REV. 2.0
DRAFT

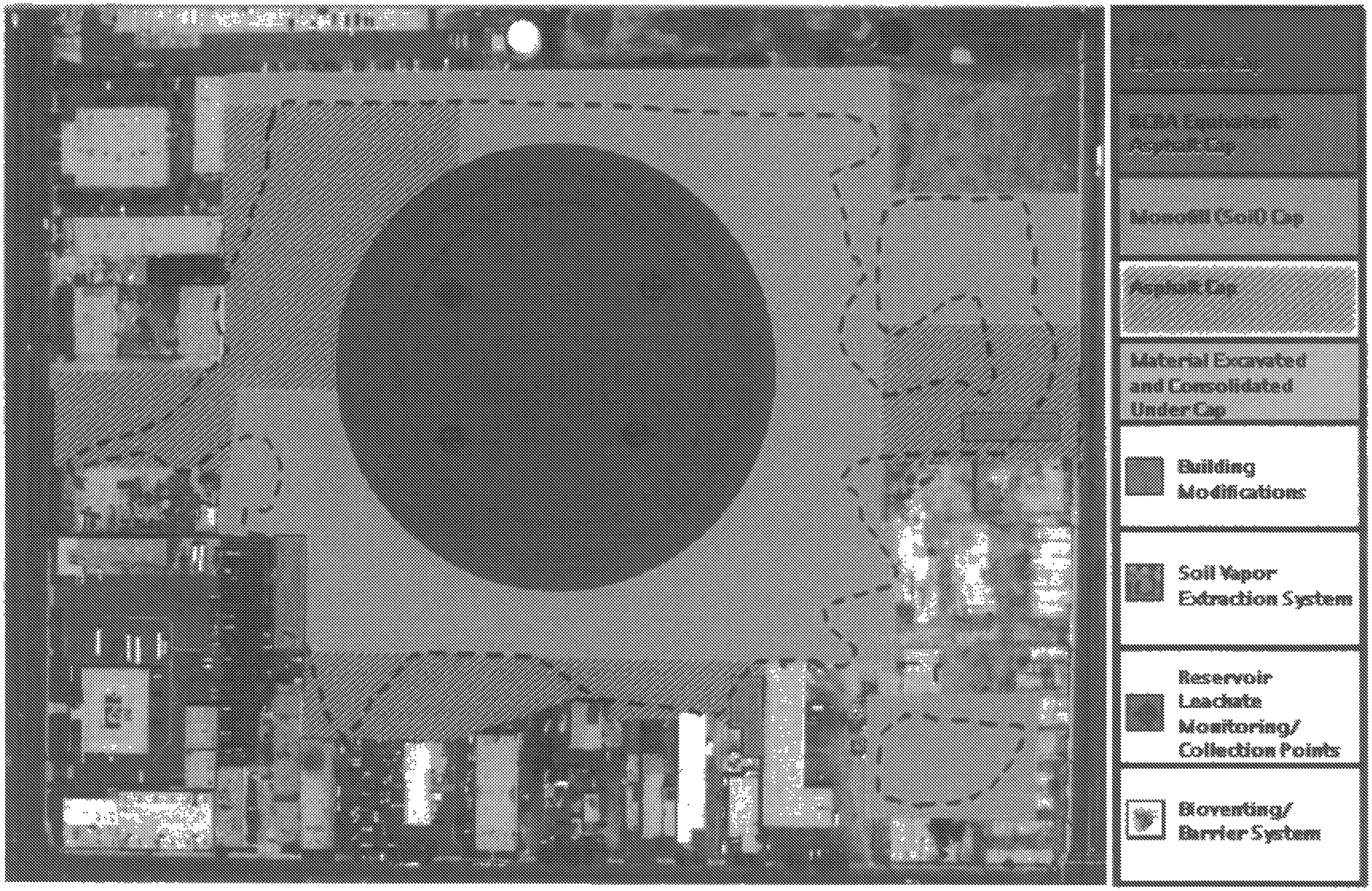
PROJECT NAVIGATOR, LTD.

ALTERNATIVE 1

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 7.1



REV. 2.0
DRAFT

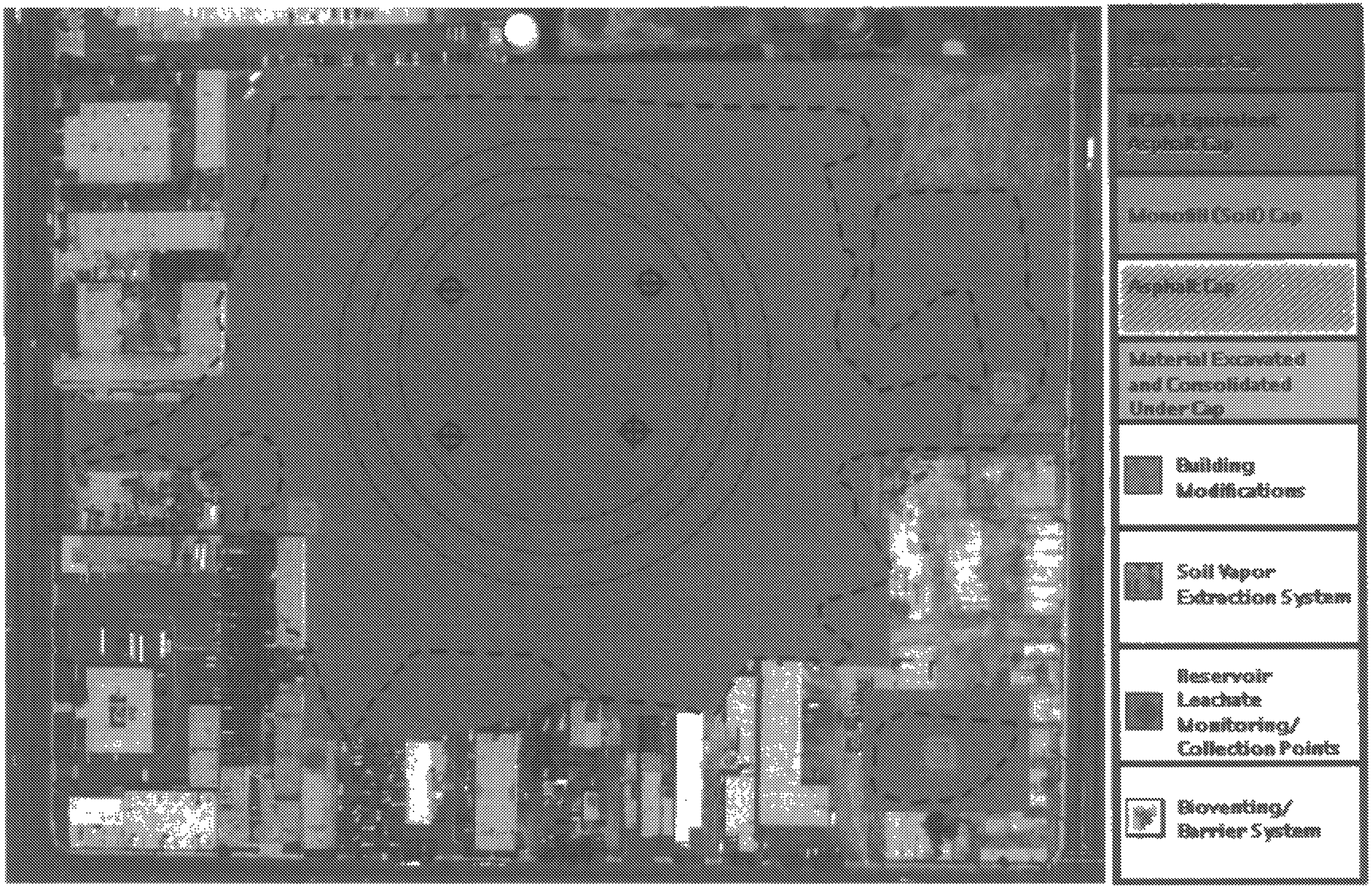
PROJECT NAVIGATOR, LTD.

ALTERNATIVE 2

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 7.2



REV. 2.0
DRAFT

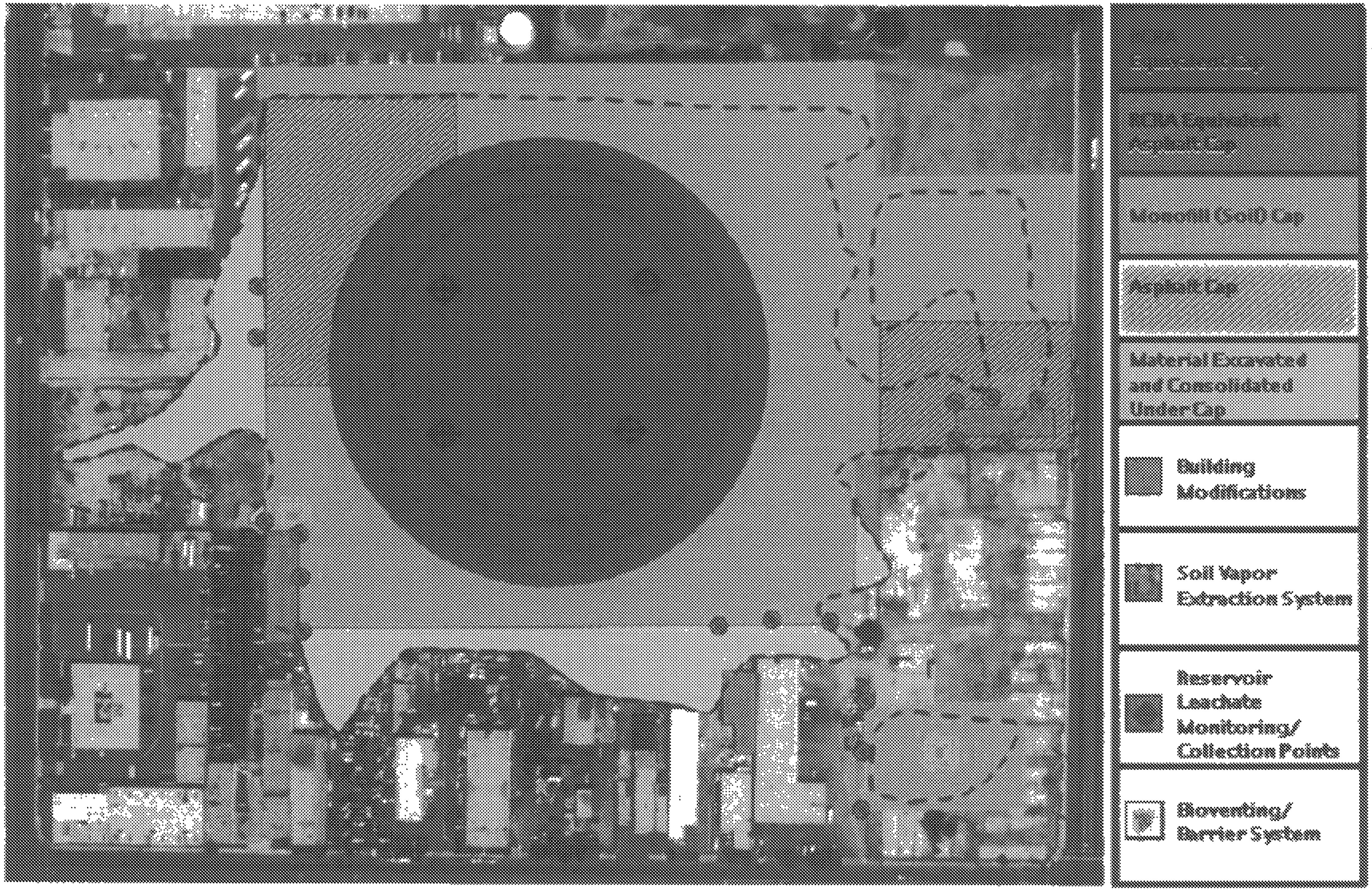
PROJECT NAVIGATOR, LTD.

ALTERNATIVE 3

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE 7.3

94-256RSFS-17 REV 07/25/00



REV. 2.0
DRAFT

PROJECT NAVIGATOR, LTD.

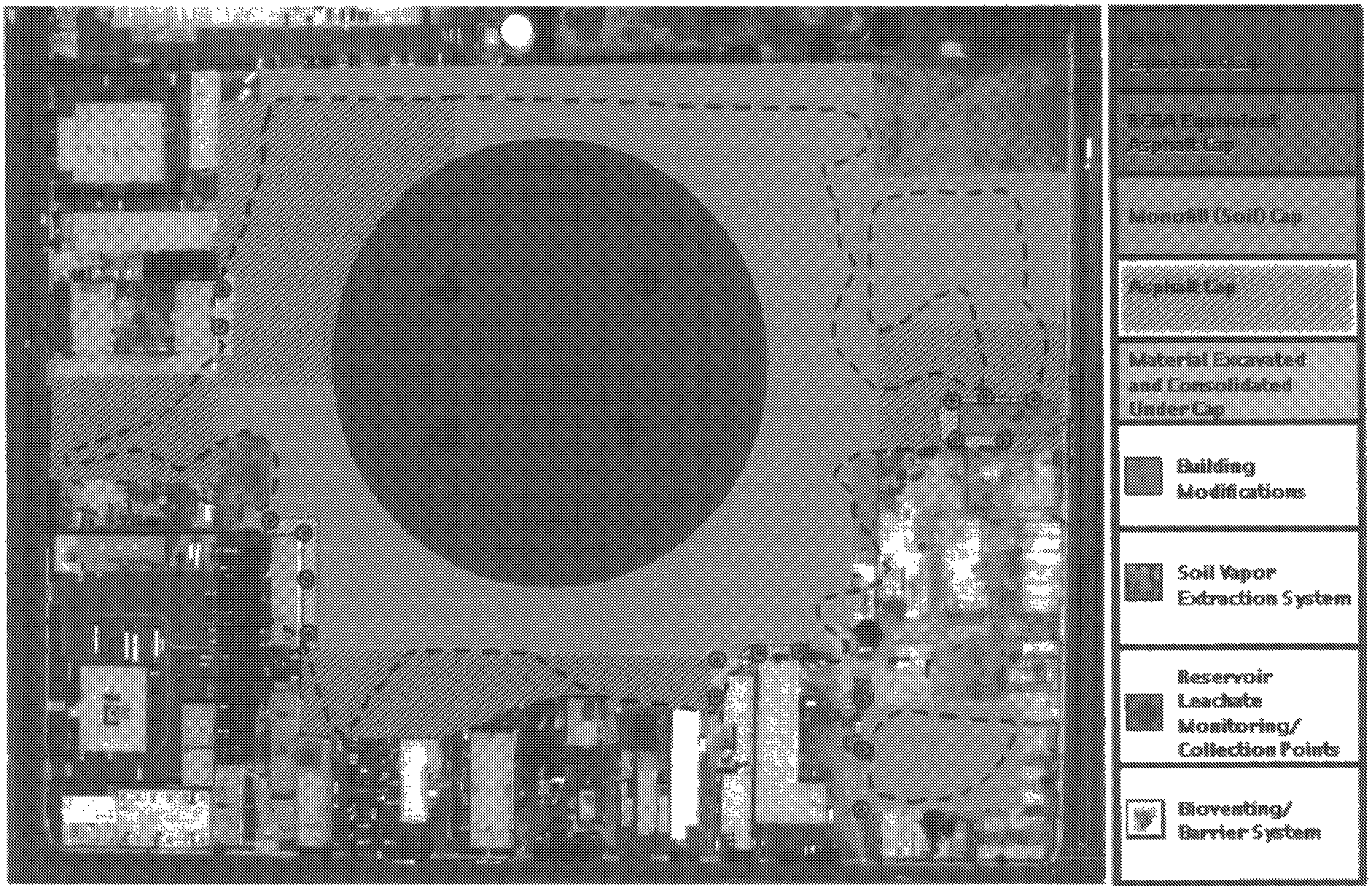
ALTERNATIVE 4

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 7.4

94-256RSFS-19 REV.07/25/00



REV. 2.0
DRAFT

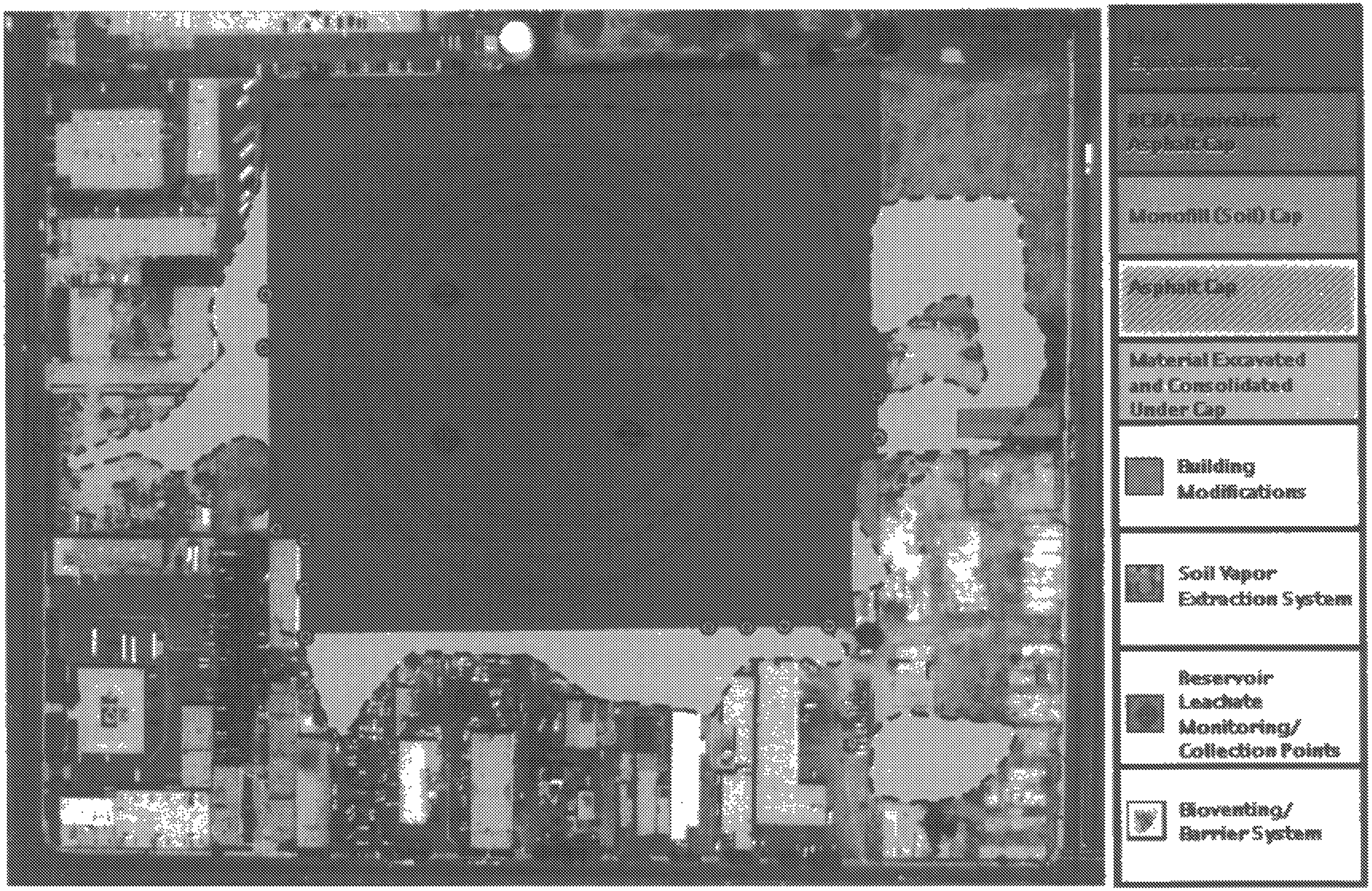
PROJECT NAVIGATOR, LTD.

ALTERNATIVE 5

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 7.5



REV. 2.0
DRAFT

PROJECT NAVIGATOR, LTD.

ALTERNATIVE 6

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 7.6

Note: Ground Water Monitoring Only.

REV. 2.0
DRAFT

PROJECT NAVIGATOR, LTD.

ALTERNATIVE 7

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 7.7

Note: Pump and treat.

REV. 2.0
DRAFT

PROJECT NAVIGATOR, LTD.

ALTERNATIVE 8

WASTE DISPOSAL INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE 7.8

8.0 REFERENCES

Advanced Foundation Engineering, Inc. 1971. *Foundation Investigation Proposed Industrial Building 12707 East Los Nietos Road, Santa Fe Springs, California.* October 22, 1971.

CDM Federal. 1999a. Ground Water Data Evaluation Report, Waste Disposal, Inc. Superfund Site, Santa Fe Springs, California. United States Army Corps of Engineers Contract No. DACW05-D-0008. January 1999.

CDM Federal. 1999b. Subsurface Gas Contingency Plan Investigation Report Waste Disposal, Inc. Superfund Site, Santa Fe Springs, California. United States Army Corps of Engineers Contract No. DACW05-96-D-0008. January 1999.

CDM Federal. 1999c. Subsurface Gas Contingency Plan Investigation Report Addendum, July 1998 Vapor Well Installation and Sampling Results, Waste Disposal, Inc. Superfund Site, Santa Fe Springs, California. United States Army Corps of Engineers Contract No. DACW05-96-D-0008. January 1999.

CDM Federal. 1999d. Subsurface Gas and In-Building Air Sampling Evaluation Report. Waste Disposal, Inc. Superfund Site, Santa Fe Springs, California, United States Army Corps of Engineers Contract No. DACW05-96-D-0008. September 15, 1999.

CDM Federal. 1999e. Report of Investigation of Reservoir Liquids Piezometer Installation, Waste Disposal, Inc. Superfund Site, Santa Fe Springs, California. United States Army Corps of Engineers Contract No. DACW05-D-0008. January 1999.

Dames & Moore. 1984. *Summary of Findings Preliminary Site Characterization, Waste Disposal, Inc.*, for Redevelopment Agency, City of Santa Fe Springs, California. Dames & Moore Job No. 13262-005-01. December 7, 1984.

Dames & Moore. 1985. *Summary of Findings Phase II Investigation, Waste Disposal, Inc. Site,* for Redevelopment Agency City of Santa Fe Springs, California. March 14, 1985.

Dames & Moore. 1986a. *Draft Summary of Findings Field Investigation Campbell Property*, Greenleaf Avenue and Los Nietos Road, Santa Fe Springs, California. Dames & Moore Job No. 13262-011-42. May 20, 1986.

Dames & Moore. 1986b. *Report Cone Penetrometer Survey, Shallow Vapor Survey, Campbell Property*, Greenleaf Avenue and Los Nietos Road, Santa Fe Springs, California. Dames & Moore Job No. 13262-014-42. August 14, 1986.

Dames & Moore. 1986c. *Report Soil Sampling Program, Toxo Spray-Dust, Inc. Site*, Santa Fe Springs, California. Dames & Moore Job No. 13262-017-042. November 5, 1986.

EBASCO Services Incorporated. 1988. Media (Soils, Soil Gas and Ground Water) Characterization Reports. 1988.

EBASCO Services Incorporated. 1989a. *Final Soil Characterization Report, Waste Disposal, Inc.* EPA Contract 68-01-7250. May 1989.

EBASCO Services Incorporated. 1989b. *Final Groundwater Characterization Report, Waste Disposal, Inc.* EPA Contract 68-01-7250. May 1989.

EBASCO Services Incorporated. 1989c. *Final Remedial Investigation Report, Waste Disposal, Inc.,* Santa Fe Springs, California. EPA Contract 68-01-7250. November 1989.

EBASCO Services Incorporated. 1989d. *Final Endangerment Assessment, Waste Disposal, Inc.,* Santa Fe Springs, California. EPA Contract 68-01-7250. November 1989.

EBASCO Services Incorporated. 1989e. *Final Subsurface-Gas Characterization Report, Waste Disposal, Inc.* EPA Contract 68-01-7250. May 1989.

EPA. 1993a. *Record of Decision (ROD) - Soils and Subsurface Gas Operable Unit.* December 22, 1993.

EPA. 1993b. *Feasibility Study Report for Soils and Subsurface Gas Waste Disposal, Inc. Superfund Site,* Santa Fe Springs, California. August 2, 1993.

EPA. 1997a. *Docket No. 97-09 - Amended Administrative Order for Remedial Design and Other Response Actions (Amending Docket No. 94-17).* 1997.

EPA. 1997b. *Attachment 2 - Amended Scope of Work for Remedial Design.* Waste Disposal, Inc. Superfund Site Soil and Subsurface Gas Operable Unit, Santa Fe Springs, California. March 1997.

EPA. 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. 1988.

ERTC. 1998. Area 7 Geoprobe Characterization Report, Waste Disposal, Inc. Site, Santa Fe Springs, California. December 1998.

ERTC. 1999a. Reservoir Characterization Report, Volume 1, Physical Characterization, Waste Disposal, Inc. Site, Santa Fe Springs, California. January 1999.

ERTC. 1999b. Reservoir Characterization Report, Volume 2, Chemical Characterization, Waste Disposal, Inc. Site, Santa Fe Springs, California. January 1999.

ERTC. 1999c. Vacuum-Enhanced Total Liquids Extraction Testing Report, Waste Disposal, Inc. Site, Santa Fe Springs, California. January 1999.

Frank Hovare & Associates. 1998. *Endangerment Assessment.* August 1998.

HSE (Hammond Soils Engineering). 1975. *Fill Investigation and Preliminary Soils Study,* Proposed Industrial Building Located at 12707 East Los Nietos Road, Santa Fe Springs, California. August 4, 1975.

Hunter, J.L. and Associates. 1987. Soil Investigation. December 1987.

Moore and Taber. 1981. Foundation Investigation. 1981.

Sweeney, R. W. Unocal. Personal communication to Dr. Ian Webster. 1997.

TRC. 1995. *Predesign and Intermediate (60%) Design Report, Soils and Subsurface Gas Remedial Design, Waste Disposal, Inc. Superfund Site,* Santa Fe Springs, California. October 1995.

TRC. 1996. *Prefinal (90%) Design Report Soils and Subsurface Gas Remedial Design.* April 1996.

TRC. 1997a. *RD Investigative Activities Workplan (Rev. 2.0).* Waste Disposal, Inc. Superfund Site. August 1997.

TRC. 1997b. *TM No. 7 - Vapor Well Construction Details.* Waste Disposal, Inc. Superfund Site. November 1997.

TRC. 1998a. *Technical Memorandum No. 11 - Reservoir Area Grading Plans and Waste/Debris Management As-Built Report.* Waste Disposal, Inc. Superfund Site. September 1998.

TRC. 1999a. *RD Investigative Activities Summary Report (Rev. 1.0),* Waste Disposal, Inc. Superfund Site. August 1999.

TRC. 1999b. *Addendum - TM No. 13 - Pilot-Scale Treatability Study for Reservoir Liquids Removal (Rev. 1.0),* Waste Disposal, Inc. Superfund Site. March 1999.

Turner. 1970. Gaussian Dispersion Model. 1970.

9.0 ACRONYMS AND ABBREVIATIONS

1. The definitions below are provided as clarification for abbreviations.

AQMD	Air Quality Management District
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
BTEX	Benzene, Toulene, Ethylbenzene and Xylenes
BTU	British Thermal Units
CCC	California Civil Code
CDI	Chronic Daily Intake
CDM	Camp, Dresser & McKee
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CFR	Code of Federal Regulations
CHSC	California Health and Safety Code
CIWMB	California Integrated Waste Management Board Liability Information System
cm/sec	centimeters per second
COC	Chemicals of Concern
DCE	Dichloroethene
DTSC	Department of Toxic Substance Control
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
ERT	Environmental Response Team
FS	Feasibility Study
GCL	geosynthetic clay layer
gpd	gallons per day
gph	gallons per hour
GRA	General Response Action
H:V	Horizontal:Vertical
HI	Health Index
IRIS	Integrated Risk Information System
km	kilometer

LCP	Leachate Collection Point
MCL	Maximum Containment Level
Mg/kg-day	daily milligrams per kilogram
msl	mean sea level
mg/L	milligrams per liter
µg/L	micrograms per liter
NCP	National Contingency Plan
NI	Negative Impact
NNA	No Net Advantage or Disadvantage
NOAEL	no-observed-adverse effect level
NPL	National Priorities List
O&M	Operation and Maintenance
PAH	Polyaromatic hydrocarbons
PCB	Polychlorinated Biphenols
PCE	Tetrachloroethylene
PI	Positive Impact
ppbv	part per billion by volume
PPE	Personal Protective Equipment
ppm	past per million
PRGs	Preliminary Remediation Goals
PRPs	Potentially Responsible Parties
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedies Design
RfD	Reference Dose
RI/FS	Remedial Investigation/Feasibility Study
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RV	Recreational Vehicle
SARA	Superfund Amendments and Reauthorization Act
SF	Slope Factors
SFS	Supplemental Feasibility Study
SNL	Significant Negative Impact
SPI	Significant Positive Impact
STLC	Soluble Threshold Limit Concentration
SVE	Soil Vapor Extraction

SVOC	Semivolatile Organic Compounds
TBC	To Be Considered
TCA	Trichlorethane
TCE	Tichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
TI	Technically Impractical
TM	Technical Memorandum
TMV	Toxicity, Mobility or Volume
TRIS	Toxic Release Inventory System
TSDF	Treatment, Storage and Disposal Facility
μg/L	micrograms per liter
UST	Underground Storage Tank
VISTA	Vista Informational Systems, Inc.
VOC	volatile organic compound
WDI	Waste Disposal, Inc.
WDIG	Waste Disposal, Inc. Group
yd^2	square yards
yd^3	cubic yards

APPENDIX A

ASSUMPTIONS FOR COST ESTIMATES - FULL EXCAVATION ALTERNATIVE

ASSUMPTIONS FOR COST ESTIMATES
FULL EXCAVATION ALTERNATIVE

CAPITAL COSTS

- Upper 3 feet of fill material will be excavated using scrapers and lower 3.2 feet will be excavated using a backhoe due to softness of underlying waste material.
- Waste material outside reservoir will be excavated using a backhoe.
- Waste material in reservoir will be excavated using a dragline.
- One-half of fill material has to be double-handled.
- Only one-half of fill material is reusable. Rest must be disposed of offsite as nonhazardous waste.
- Average depth of fill material is 6.2 feet.
- Waste material will be disposed of as a hazardous waste and reservoir waste will require pretreatment prior to disposal.
- 1 cubic yard of waste weighs 1.5 tons.
- Assume that the concrete on the bottom of the reservoir requires removal and offsite disposal as a hazardous waste.
- Concrete on the bottom of the reservoir is 4 inches thick with wire mesh reinforcement.
- Site to be restored to approximately the preexcavation grades.
- Imported fill is obtained for hauling cost only.
- Four buildings underlain by waste will have to be demolished.
- Complete demolition of buildings at 9843 Greenleaf and 12637B, 12747 and 12801 Los Nietos Road.
- Building at 9843 Greenleaf - 40-foot x 140-foot metal building, wall height 16 feet, roof ridge height 24 feet. 112,000 cubic feet interior volume. Assume no interior walls. Concrete slab on grade. Assume shallow spread concrete footings.
- Building at 12637B Los Nietos Road - 40-foot x 160-foot concrete block building. Wall height 16 feet. Flat roof. 102,400 cubic feet interior volume. Assume no interior walls. Concrete slab on grade. Assume shallow spread concrete footings.
- Buildings at 12747 and 12801 Los Nietos Road:
  - (40 feet x 72 feet) + (24 feet x 44 feet) x 16-foot wall height. Flat roof. 62,976 cubic feet interior volume. Assume interior walls, concrete slab on grade and shallow spread concrete footings, concrete block construction for both buildings.
  - (40 feet x 164 feet) + (20 feet x 20 feet) x 16-foot wall height. Flat roof. 111,360 cubic feet interior volume.
- Masonry and concrete are disposed onsite.

ASSUMPTIONS FOR COST ESTIMATES
FULL EXCAVATION ALTERNATIVE
(Continued)

- No asbestos or other hazardous materials to be disposed of from building demolition.
- New catch basins are required at four locations.
- Approximately 3,300 feet of storm drainage swales are required.
- Construction is staged such that excavation of wastes occurs primarily during the dry season. A maximum of 2 inches of rain (approximately 10 percent of average annual rainfall) contacts 10 percent of the waste area outside of the reservoir to be exposed.
- The following total quantities of stormwater protective measures are required:
  - 1,000 lineal feet of hay bales.
  - 1,000 lineal feet of silt fence.
- Contaminated stormwater is taken to an offsite industrial disposal facility and disposed at a cost of $0.25 per gallon.

TABLE A.1

FULL EXCAVATION

DESCRIPTION	QUANTITY	UNIT	UNIT $	TOTAL $
DIRECT CAPITAL COSTS				
Excavation and Offsite Disposal				
Remove Upper 3 feet of Fill Material	85,722	CY	3.38	289,741
Remove Lower 3.2 feet of Fill Material	91,437	CY	5.25	480,044
Excavate Waste in Reservoir and Load onto Trucks	148,000	CY	5.78	855,440
Temporary Structure Over Reservoir Waste Excavation	1	Lump sum	1,872,000.00	1,872,000
Excavate Nonreservoir Waste and Load onto Trucks	218,047	CY	2.62	571,283
Transportation and Disposal	549,071	Ton	75.00	41,180,287
Stabilization of Reservoir Waste	222,000	Ton	30.00	6,660,000
Demolition of Concrete Reservoir Lining	204,341	SF	3.35	684,542
Disposal of Reservoir Lining Concrete	5,109	Ton	75.00	383,139
Double Handling of Reusable Fill	44,290	CY	2.73	120,912
Place and Compact Reusable Fill into Excavations	88,580	CY	1.49	131,984
Replace Excavated Waste and Nonreusable Fill with Clean Imported Fill	457,150	CY	16.51	7,547,547
Fine Grading	85,722	SY	0.14	12,001
Hazardous Waste Disposal Tax	549,071	Ton	22.00	12,079,551
Transportation and Disposal of Nonreusable fill Material	132,870	Ton	20.00	2,657,400
Building Demolition	1	Lump sum	210,317.00	210,317
Hydroseed Disturbed Areas	771,500	SF	0.05	36,261
Irrigation System	1	System	36,485.00	36,485
Contractor Mobilization/Demobilization	1	Each	13,980.00	13,980
Health and Safety	1	Each	350,000.00	350,000
Site Security	1	Each	100,000.00	100,000
Stormwater Control	1	Each	100,000.00	100,000
Liquid Waste Management	1	Each	250,000.00	250,000
Cleanup Confirmation Sampling	1	Each	250,000.00	250,000
Temporarily Relocate Businesses(1)	–	–	–	–
			Subtotal	77,083,231
			Risk Contingency (50%)	38,436,457
			Total Costs	**115,309,371**
Surface Water Controls				
Construct New Catch Basins	4	Basin	3,325.00	13,300
Construct Drainage Swales	3,300	LF	4.24	14,003
			Total Cost	**27,303**
			Subtotal	115,336,674
Los Angeles City Cost Index (5.1%)				5,882,170
				121,218,844
Engineering, Permitting, Construction Management, Monitoring (25%)				30,304,711
			Total Direct Capital Costs	**$151,523,555**

94-25(VRpts/SFS(Rev. 2.0) (7/25/00)(rm)

(1) There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but it cannot be quantified at this time.

APPENDIX B

ASSUMPTIONS FOR COST ESTIMATES - ALTERNATIVES 1 THROUGH 8

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 1

CAPITAL COSTS

- There are not capital costs for Alternative 1.

GROUND WATER MONITORING

- Eight samples will be sampled per quarter as discussed in the EPAs 1999 ground water report.
- VOCs and total recoverable metals will be analyzed each quarter. Costs for the tests are $135/sample and $125/sample, respectively.
- SVOCs and PCBs will be analyzed on a semiannual basis. Costs for the tests are $250/sample and $108/sample, respectively.
- Average time to collect one sample is 2 hours.
- Technician cost is $65/hour.
- Well development cost is $1,000/quarter.

ANNUAL REPORTS

- Analytical data will be compiled into an annual report. Cost will be $10,000/year.

SHIPPING COSTS

- $2,000/year includes shipping all collected samples to laboratories.

Alternative 1					
DESCRIPTION	QUANTITY	UNIT	COST/UNIT		TOTAL
NO DIRECT CAPITAL COSTS					
Current monitoring programs continue					
			Subtotal	$	-
Los Angeles City Cost Index (5.1%)				$	-
			Subtotal	$	-
Engineering, Permitting, Construction Management, Monitoring (25%)				$	-
			Total Direct Capital Costs	**$**	**-**
ANNUAL OM&M COSTS FOR ALTERNATIVE 1					
Ground Water Monitoring				$	408,451
Annual Reports				$	183,920
Annual Shipping Costs				$	36,784
			Total OM&M present worth costs		$629,155
Total Cost including direct costs and present worth of OM&M					**$629,155**

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 2

CAPITAL COSTS

- RCRA-equivalent cap will be constructed over the reservoir. The area to be capped is from the outside edge of the crest of the reservoir, i.e., a circular area with a diameter of 624 feet.
- The RCRA-equivalent cap will consist of, from the top down:
  - A 2-foot-thick vegetative layer;
  - A single-sided geocomposite drainage layer;
  - A 60-mil-thick HDPE geomembrane; and
  - A single-sided geocomposite gas collection layer.
- Gas collection system under the RCRA-equivalent cap is based on April 1996 remedial design; is run the first year as an active system and then is converted to a passive system; extracted gas is treated by carbon adsorption; and a 2 horsepower 50 scfm blower will be adequate for the system.
- The existing fill material generally satisfies the performance standard for a monofill cap. All that is required to complete the monofill cap is Site preparation to remove construction debris and contaminated soil, fine-grading, installation of an irrigation system and vegetation.
- Fill needs to be imported to establish the minimum 3 percent slope (recommended in EPA guidance documents) required for the cap over the reservoir. Existing grade is at approximately 2 percent slope. Imported fill is obtained for hauling cost only.
- Portions of the areas outside Area 2, where sump-like material exists, are already capped with fill, pavement and/or structures which meet the performance requirements of a monofill cap. However, assume that 20 percent of this area requires upgrade and/or repair of the pavement. Upgrade will consist of construction of 4-inch-thick asphaltic concrete over 8-inch-thick crushed aggregate base course.
- Portions of the areas outside Area 2 not covered by existing pavement or structures have existing fill which generally satisfies the performance standard for a monofill cap. All that these areas require are Site preparation to remove construction debris and contaminated soil, fine-grading, installation of an irrigation system and vegetation.
- Demolished existing pavements are disposed of onsite.
- Assume an average of 1.5 feet of fill needs to be imported, placed and compacted on the nonpaved areas outside of Area 2 to achieve a minimum 3 percent grade (recommended in EPA guidance documents).
- There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but we cannot quantify it at this time.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 2
(Continued)

- Each reservoir leachate collection point will consist of 4-inch diameter PVC slotted and blank casing, installed following standard ground water monitoring well procedures.
- Maximum depth of reservoir leachate collection points will be 30 feet.
- Dedicated pumps will not be installed in the reservoir leachate collection points.
- Based on the results of the TM No. 13 Treatability Study, a maximum of three reservoir leachate collection points will be installed.
- Existing wells are extended an average of 5 feet.
- Existing wells to be abandoned average 25 feet deep.
- Existing wells within the reservoir (39 wells) will be abandoned as discussed in Addendum 3 to TM No. 13. Existing wells outside of the reservoir (34) will be extended up through the new cap.
- Perimeter gas control system consists of biovent wells some of which inject oxygen into the subsurface when high pressure atmospheric conditions exist and some of which vent soil gas when low pressure atmospheric conditions exist.
- Perimeter gas control wells consist of 4-inch diameter perforated and solid PVC pipe.
- Bottoms of perimeter gas control wells are installed to 5 feet below the elevation of the bottom of the sump-like material. Locations, depths and operation of perimeter gas control wells would be established during the remedial design and may require additional data collection.
- Radius of influence of each perimeter gas control well is 37 feet. Hence, wells are located on 74-foot centers.
- Perimeter gas control wells are only required around the perimeter of areas containing sump-like material, where gas migration is known.
- The following total quantities of stormwater protective measures are required:
  - 1,000 lineal feet of hay bales.
  - 1,000 lineal feet of silt fence.
- New catch basins are required at four locations.
- Approximately 3,300 feet of storm drainage swales are required.
- Building engineering controls are required for existing buildings which are constructed completely or partially over waste material, i.e., 9843 Greenleaf Avenue, and 12801, 12747 and 12637B Los Nietos Road.
- Control system will consist of cutting floor slab; installing vent pipe; repairing floor slab; and sealing floor slab at a cost of $25,000 per building.

- Gas will require treatment by an appropriate technology, e.g., filtering through a carbon canister, prior to discharge to the atmosphere.
- Systems can be converted from active systems to passive systems after first 5 years of operation.
- Existing building occupants will have to be temporarily relocated at a cost of $10,000 per building.

O&M COSTS

CAP - AREA 2 (including reservoir)

- Grass (621,600 ft^2) will be mowed once/year at a cost of $1.62/1,000 ft^2.
- Irrigation water for Area 2 (including reservoir) assumes 1.5 inches/mo over 621,600 ft^2 at a cost of $1.36/100 ft^3. The cost increases to $1.54/100 ft^3 after the first 1,800 ft^3 of water per month.
- The irrigation systems will need to be serviced once a year at a cost of $500/year.
- The irrigation system will need to be replaced at Year 15. $17,325 is the cost of the original system.
- Rodent control for entire Site costs $2,000/year.

PASSIVE GAS CONTROL SYSTEM BENEATH RCRA CAP

- System is active for 1 year, then runs passively from Years 2 through 30.
- Cost for electricity to run blower is $1,500/year.
- Service for the blower will occur twice a month at $200/month.
- One sample will be collected each month for the first year and analyzed for the same constituents as the vapor wells.
- Equipment rental and labor costs are the same as the costs for the soil gas monitoring.
- After the first year, the system will be sampled once per quarter.
- It is assumed that the standpipe will have to be replaced twice during 30 years due to vandalism or other damage.

PERIMETER PASSIVE GAS CONTROL SYSTEM

- Sample eight wells each quarter for the first year.
- After the first year, sampling will occur annually.
- Sampling costs are the same as for the soil gas monitoring ($355/sample).
- Average time to collect one sample is approximately 1 hour. Technician cost is $65/hour.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 2
(Continued)

MONOFILL CAP - OUTSIDE AREA 2

- Grass (110,100 ft^2) will be mowed once/year at a cost of $1.62/1,000 ft^2.
- Irrigation water for this area assumes 1.5 inches/month over (110,100 ft^2) at a cost of $1.36/100 ft^3.
- The irrigation system will need to be replaced at Year 15. $5,207 is the cost of the original system.
- Irrigation system would need to be serviced once a year at a cost of $500/year.
- Replace 20 percent of asphalt every 7-1/2 years so that at the end of 30 years all of the asphalt has been replaced.
  - Use cutting, removal, hauling, disposal and compact subgrade and lay asphalt costs from direct cost table.

LEACHATE COLLECTION POINTS

- Based on the results of the TM No. 13 Treatability Study and the anticipated decrease in the quantity of reservoir liquids following construction of the cap, the assumed cost for pumping and hauling to disposal facility is $659 per quarter. This price assumes 225 gallons, which is the minimum load accepted.
- Disposal fee is $1.00/gallon.

SOIL GAS MONITORING

- Seventy samples will be collected from the vapor wells around the perimeter and close to buildings on a quarterly basis. This number is based on the assumed postremediation configuration of the Site. It reflects a reduction from the number of samples currently being taken due to changes to the Site configuration (e.g., abandonment of some of the existing monitoring points) during remediation.
- The samples will be analyzed for methane and total nonmethane organics (EPA Method 25C) and VOCs (TO-15).
- EPA Method 25C costs $85/sample and Method TO-15 costs $225/sample.
- $45/sample is charged for summa canister rental.
- Average time to collect one sample is approximately 1 hour.
- Technician cost is $65/hour.
- Equipment rental costs $2,000/quarter.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 2
(Continued)

IN-BUSINESS AIR MONITORING

- Fourteen samples will be collected for the onsite businesses on a quarterly basis.
- The samples will be analyzed for the same constituents as the vapor wells.
- The price for the tests is the same as for the soil gas monitoring.
- The samples are collected over a 24-hour period, but the average time for labor costs works out to be approximately 1 hour. Technician cost is $65/hour.
- Equipment rental costs $500/hour.

GROUND WATER MONITORING

- Eight samples will be sampled per quarter as discussed in the EPAs 1999 ground water report.
- VOCs and total recoverable metals will be analyzed each quarter. Costs for the tests are $135/sample and $125/sample, respectively.
- SVOCs and PCBs will be analyzed on a semiannual basis. Costs for the tests are $250/sample and $108/sample, respectively.
- Average time to collect one sample is 2 hours.
- Technician cost is $65/hour.
- Well development cost is $1,000/quarter.

STORMWATER MONITORING

- $15,000/year based on 1999 budget.

ANNUAL REPORTS

- Analytical data will be compiled into an annual report. Cost will be $10,000/year.

SHIPPING COSTS

- $2,000/year includes shipping the collected samples to laboratories.
- Replace 20 percent of asphalt every 7-1/2 years so that at the end of 30 years all of the asphalt has been replaced.
    - Use cutting, removal, hauling, disposal and compact subgrade and lay asphalt costs from direct cost table.

Alternative 2				
DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
DIRECT CAPITAL COSTS				
RCRA-Equivalent Cap (305,660 SF)				
Site clearing	7	acre	$ 1,550.00	$ 10,876
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	3,736	CY	$ 16.51	$ 61,681
Grading slopes	305,660	SF	$ 0.02	$ 4,755
Geosynthetics	305,660	SF	$ 1.25	$ 382,075
Vegetative layer	22,642	CY	$ 5.89	$ 133,361
Irrigation System	1	system	$ 14,455.00	$ 14,455
Vegetate	305,660	SF	$ 0.05	$ 15,894
Wells to be abandoned	39	well	$ 875.00	$ 34,125
Wells to be extended	34	well	$ 99.75	$ 3,392
Total Cost				**$ 661,874**
Soil Gas Control beneath RCRA-Equivalent Cap				
Gas Collection System	1	system	$ 22,114.00	$ 22,114
Total Cost[1]				**$ 22,114**
Monofill Area 2 not including reservoir (315,940 SF)				
Site clearing	7	acre	$ 1,550.00	$ 11,242
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	17,552	CY	$ 16.51	$ 289,784
Fine grading	315,940	SF	$ 0.03	$ 8,718
Irrigation System	1	system	$ 14,941.00	$ 14,941
Vegetate	315,940	SF	$ 0.05	$ 16,429
Total Cost				**$ 342,374**
Monofill areas outside Area 2 (110,100 SF)				
Site Preparation	1	lump sum	$ 5,178.00	$ 5,178
Fine grading	110,100	SF	$ 0.03	$ 3,038
Irrigation System	1	system	$ 5,207.00	$ 5,207
Vegetate area	110,100	SF	$ 0.05	$ 5,725
Import Fill	6,117	CY	$ 16.51	$ 100,992
Temporarily relocate businesses[2]	--	--	--	--
Total Cost				**$ 120,140**
Paved areas to be repaired/upgraded (20% of 69,800 SF) outside of Area 2				
Cutting	372	LF	$ 1.15	$ 428
Removal	1,707	SY	$ 3.82	$ 6,521
Hauling	569	CY	$ 2.63	$ 1,496
Compact subgrade	284	CY	$ 0.45	$ 128
Place base course, asphalt and compact	1,707	SY	$ 17.45	$ 29,787
Temporarily relocate businesses[2]	--	--	--	--
Total Cost				**$ 38,360**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
Reservoir Leachate Collection Points				
Installation of leachate collection points (30 feet deep)	3	points	$ 1,050.00	$ 3,150
Total Cost				**$ 3,150**
Perimeter Passive Gas Control System				
Installation of biovent wells (25 feet deep)	49	well	$ 1,702.00	$ 83,398
Total Cost				**$ 83,398**
Contractor Mobilization/Demobilization				
Mob/demob	1	mob/demob	$ 24,680.00	$ 24,680
Total Cost				**$ 24,680**
Surface Water Controls				
Construct new catch basins	4	basin	$ 3,325.00	$ 13,300
Construct drainage swales	3,300	LF	$ 4.24	$ 14,003
Total Cost				**$ 27,303**
Stormwater Management				
Hay Bales	1,000	LF	$ 7.15	$ 7,150
Silt Fence	1,000	LF	$ 0.88	$ 880
Total Cost				**$ 8,030**
Building Engineering Controls				
Install Control System	4	system	$ 25,000.00	$ 100,000
Temporarily relocating existing building occupants	4	building	$ 10,000.00	$ 40,000
Total Cost				**$ 140,000**
			Subtotal	$ 1,471,422
Los Angeles City Cost Index (5.1%)				$ 75,043
			Subtotal	$ 1,546,465
Engineering, Permitting, Construction Management, Monitoring (25%)				$ 386,616
Institutional Controls	1	lump sum	$ 500,000.00	$ 500,000
			Total Direct Capital Costs	**$ 2,433,081**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT		TOTAL
ANNUAL OM&M COSTS FOR ALTERNATIVE 2					
RCRA-Equivalent Cap over Reservoir				$	317,790
Gas Control System Monitoring beneath RCRA cap					
First year cost				$	16,367
Years 2 through 30				$	66,372
Replace standpipe Year 10				$	620
Replace standpipe Year 20				$	529
Monofill Cap Area 2 not including Reservoir				$	20,888
Perimeter Passive Gas Control System Monitoring					
First year cost				$	12,986
Years 2 through 30				$	60,600
Monofill Cap outside Area 2				$	48,561
Replace 20% of asphalt every 7.5 years					
7.5 years				$	42,851
15 years				$	33,106
22.5 years				$	25,578
30 years				$	19,761
Reservoir Leachate Collection Points				$	65,034
Soil Gas Monitoring				$	2,310,041
Ground Water Monitoring				$	408,451
In-Business Air Monitoring				$	469,365
Stormwater Monitoring				$	275,881
Site Management				$	110,352
Annual Reports				$	183,920
Annual Shipping Costs				$	36,784
	Total OM&M present worth costs				$4,525,837
	Total Cost including present worth of OM&M				**$6,958,918**

[1] Total cost is subject to change during design.

[2] There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but it cannot be quantified at this time.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 3

CAPITAL COSTS

- Reservoir cap will consist of, from the top down:
  - 4-inch-thick layer of asphaltic concrete.
  - 8-inch-thick layer of aggregate base course.
  - 16-ounce/square yard geotextile.
  - 60 mil HDPE geomembrane.
  - Single-sided geocomposite gas collection layer.

  Area to be capped is from the outside edge of the crest of the reservoir, i.e., a circular area with a diameter of 624 feet.
- Fill needs to be imported to establish the minimum 3 percent slope (recommended in EPA guidance manuals) required for the cap. Existing grade is at approximately 2 percent slope. Imported fill is obtained for hauling cost.
- Cap outside of the reservoir will consist of:
  - 4-inch-thick layer of asphaltic concrete.
  - 8-inch-thick layer of aggregate base course.
  - 16 oz/sy geotextile.
  - 60-mil-thick geomembrane.
  - single-sided geocomposite gas collection layer.
- Portions of the areas outside Area 2, where sump-like material exists, are already capped with fill, pavement and/or structures which meet the performance requirements of an asphalt cap. However, assume that 20 percent of this area requires upgrade and/or repair of the pavement. Upgrade will consist of construction of 4-inch-thick asphaltic concrete over 8-inch-thick crushed aggregate base course.
- Portions of the areas outside Area 2 not covered by existing pavement or structures will be paved with 4 inches of asphaltic concrete over 8 inches of aggregate base course.
- Demolished existing pavements are disposed of onsite in filled areas.
- There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but we cannot quantify it at this time.
- Assume an average of 1.5 feet of fill needs to be imported, placed and compacted on the nonpaved areas outside of Area 2 to achieve a minimum 3 percent grade (recommended in EPA guidance manuals).
- Gas collection system under the reservoir cap is based on system included in April 1996 Remedial Design.
- Gas collection system under the reservoir cap is run for the first year as an active system then converted to a passive system.
- Treatment is required for extracted gas.

ASSUMPTIONS FOR COST ESTIMATES ALTERNATIVE 3

(Continued)

- A 2-horsepower, 50 scfm blower will be adequate for the proposed gas collection system under the reservoir cap. Blower will be mounted on a concrete slab and enclosed by a 10-foot x 10-foot metal building. The system would include monitoring points to assure that the system is developing a vacuum beneath the entire cap.
- Gas collection system under the cap on Area 2 (outside of the reservoir) will be similar to the system under the reservoir cap.
- Each reservoir leachate collection point will consist of 4-inch diameter PVC slotted and blank casing installed following standard ground water monitoring well procedures.
- Maximum depth of reservoir leachate collection point will be 30 feet.
- Dedicated pumps will not be installed in the reservoir leachate collection point.
- Based on the results of the TM No. 13 Treatability Study, a maximum of three reservoir leachate collection points will be installed.
- The perimeter gas collection system consists of biovent wells some of which inject oxygen into the subsurface when high pressure atmospheric conditions exist and some of which vent soil gas when low pressure atmospheric conditions exist.
- The perimeter gas collection wells consist of 4-inch diameter perforated and solid PVC pipe.
- Bottoms of the perimeter gas collection wells are installed 5 feet below to the elevation of the bottom of the sump-like material. Locations, depths and operation of perimeter gas control wells would be established during the remedial design and may require additional data collection.
- Radius of influence of each perimeter gas collection well is 37 feet. Hence, wells are located on 74-foot centers.
- The perimeter gas collection wells are required around the perimeter of areas containing sump-like material, where gas migration is known.
- New catch basins are required at four locations.
- Approximately 3,300 feet of storm drainage swales are required.
- The following total quantities of stormwater protective measures are required:
  - 1,000 lineal feet of hay bales.
  - 1,000 lineal feet of silt fence.
- Building engineering controls are required for existing buildings which are constructed completely or partially over waste material, i.e., 9843 Greenleaf Avenue, and 12801, 12747 and 12637B Los Nietos Road.

- Control system will consist of cutting floor slab; installing vent pipe; repairing floor slab; and sealing floor slab at a cost of $25,000 per building.
- Gas will require treatment by an appropriate technology, e.g., filtering through a carbon canister, prior to discharge to the atmosphere.
- Systems can be converted from active systems to passive systems after first 5 years of operation.
- Existing building occupants will have to be temporarily relocated at a cost of $10,000 per building.
- SVE systems will be required at five noncompliance areas and each SVE system will consist of: six 25-foot-deep wells; 100 feet of PVC piping per well; and a 1.5 horsepower regenerative vacuum blower.

O&M COSTS

ASPHALT CAP OVER RESERVOIR

- Replace 10 percent of cap over 30 years.
- $927,621 is the original cost of the asphalt cap.
- Cap will be slurry sealed at Years 10, 20 and 30. Cost of slurry seal is $0.035/ ft^2.

GAS CONTROL SYSTEM BENEATH ASPHALT CAP OVER RESERVOIR

- System is active for one year, then runs passively from Year 2 through 30.
- Cost for electricity to run blower is $1,500/year.
- Service for the blower will occur twice/month at $200/month.
- One sample will be collected each month for the first year and analyzed for the same constituents as the vapor wells.
- Equipment rental and labor costs are the same as the costs for the soil gas monitoring.
- After the first year, the system will be sampled once per quarter.
- It is assumed that the standpipe will have to be replaced twice during 30 years due to vandalism or other damage.

PERIMETER PASSIVE GAS CONTROL SYSTEM

- Sample eight wells each quarter for the first year.
- After the first year, sampling will occur annually.
- Sampling costs are the same as for the soil gas monitoring ($355/sample).
- Average time to collect one sample is approximately 1 hour. Technician cost is $65/hour.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 3
(Continued)

ASPHALT CAP OVER AREA 2 (not including reservoir)

- Replace 10 percent of cap over 30 years.
- $851,161 is the original cost of the asphalt cap.
- Cap will be slurry-sealed at Years 10, 20 and 30. Cost of slurry seal is $0.035/ft^2.

PASSIVE GAS CONTROL SYSTEM BENEATH ASPHALT CAP OVER AREA 2

- System is active for one year, then runs passively from Year 2 through 30.
- Cost for electricity to run blower is $1,500/year.
- Service for the blower will occur twice/month at $200/month.
- Two samples will be collected each month for the first year and analyzed for the same constituents as the vapor wells.
- Equipment rental and labor costs are the same as the costs for the soil gas monitoring.
- After the first year, the system will be sampled twice per quarter.
- It is assumed that the standpipe will have to be replaced twice during 30 years due to vandalism or other damage.

ASPHALT CAP OUTSIDE AREA 2

- Replace 10 percent of cap over 30 years.
- $216,488 is the original cost of the asphalt cap.
- Cap will be slurry-sealed at Years 10, 20 and 30. Cost of slurry seal is $0.035/ ft^2.

LEACHATE COLLECTION POINTS

- Based on the results of the TM No. 13 Treatability Study and the anticipated decrease in the quantity of reservoir liquids following construction of the cap, the assumed cost for pumping and hauling to disposal facility is $659. This assumes 225 gallons which is the minimum load accepted.
- Disposal fee is $1.00/gallon.

SOIL GAS MONITORING

- Seventy samples will be collected from the vapor wells around the perimeter and close to buildings on a quarterly basis. This number is based on the assumed postremediation configuration of the Site. It reflects a reduction from the number of samples currently being taken due to changes to the Site configuration (e.g., abandonment of some of the existing monitoring points) during remediation.
- The samples will be analyzed for methane and total nonmethane organics (EPA Method 25C) and VOCs (TO-15).

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 3
(Continued)

- EPA Method 25C costs $85/sample and Method TO-15 costs $225/sample.
- $45/sample is charged for summa canister rental.
- Average time to collect one sample is approximately 1 hour.
- Technician cost is $65/hour.
- Equipment rental costs $2,000/quarter.

IN-BUSINESS AIR MONITORING

- Fourteen samples will be collected for the onsite businesses on a quarterly basis.
- The samples will be analyzed for the same constituents as the vapor wells.
- The price for the tests is the same as for the soil gas monitoring.
- The samples are collected over a 24-hour period, but the average time for labor costs works out to be approximately 1 hour. Technician cost is $65/hour.
- Equipment rental costs $500/hour.

GROUND WATER MONITORING

- Eight samples will be sampled per quarter as discussed in the EPAs 1999 ground water report.
- VOCs and total recoverable metals will be analyzed each quarter. Costs for the tests are $135/sample and $125/sample, respectively.
- SVOCs and PCBs will be analyzed on a semiannual basis. Costs for the tests are $250/sample and $108/sample, respectively.
- Average time to collect one sample is 2 hours.
- Technician cost is $65/hour.
- Well development cost is $1,000/quarter.

STORMWATER MONITORING

- $15,000/year based on 1999 budget.

SITE MANAGEMENT

- $6,000/year based on 1999 budget.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 3
(Continued)

ANNUAL REPORTS

- Analytical data will be compiled into an annual report. Cost will be $10,000/year.

SHIPPING COSTS

- $2,000/year includes shipping all collected samples to laboratories.

Alternative 3

DESCRIPTION	QUANTITY	UNIT	COST/UNIT		TOTAL	
DIRECT CAPITAL COSTS						
RCRA-Equivalent Asphalt Cap over reservoir (305,660 SF)						
Site clearing	7	acre	$	1,550.00	$	10,876
Rubbish handling and loading	20	CY	$	33.00	$	660
Disposal fee	30	ton	$	20.00	$	600
Import fill	35,336	CY	$	16.51	$	583,397
Compact subgrade	5,660	CY	$	1.10	$	6,226
Grading slopes	33,962	SY	$	0.14	$	4,755
Geosynthetics	305,660	SF	$	1.06	$	324,000
Place and compact gravel base course	33,962	SY	$	9.70	$	329,433
Place and compact asphalt	33,962	SY	$	7.75	$	263,207
Wells to be abandoned	39	well	$	875.00	$	34,125
Wells to be extended	34	well	$	99.75	$	3,392
Total Cost					**$**	**1,560,671**
Soil Gas Control beneath Reservoir Asphalt Cap						
Gas Collection System	1	system	$	22,114.00	$	22,114
Total Cost[1]					**$**	**22,114**
Asphalt Cap over Area 2 not including reservoir (433,540 SF)						
Site clearing	10	acre	$	1,550.00	$	15,427
Rubbish handling and loading	20	CY	$	33.00	$	660
Disposal fee	30	ton	$	20.00	$	600
Compact subgrade	8,029	CY	$	1.10	$	8,831
Grading slopes	48,171	SY	$	0.14	$	6,744
Geosynthetics	433,540	SF	$	1.06	$	459,552
Place and compact gravel base course	48,171	SY	$	9.70	$	467,260
Place and compact asphalt	48,171	SY	$	7.75	$	373,326
Total Cost					**$**	**1,332,400**
Soil Gas Control beneath Asphalt Cap						
Gas Collection System	1	system	$	22,857.00	$	22,857
Total Cost[1]					**$**	**22,857**
Asphalt cap over areas outside Area 2 (110,100 SF)						
Site clearing	2.5	acre	$	1,550.00	$	3,918
Rubbish handling and loading	20	CY	$	33.00	$	660
Disposal fee	30	ton	$	20.00	$	600
Compact subgrade	1,190	CY	$	1.10	$	1,309
Grading slopes	12,233	SY	$	0.14	$	1,713
Import Fill	6,117	CY	$	16.51	$	100,992
Place and compact gravel base course	12,233	SY	$	9.70	$	118,660
Place and compact asphalt	12,233	SY	$	7.75	$	94,806
Temporarily relocate businesses[2]	--	--		--		--
Total Cost					**$**	**322,657**
Paved areas to be repaired/upgraded (20% of 76,800 SF) outside of Area 2						
Cutting	372	LF	$	1.15	$	428
Removal	1,707	SY	$	3.82	$	6,519
Hauling	569	CY	$	2.63	$	1,496
Compact subgrade	284	CY	$	0.45	$	128
Place and compact aggregate base course	1,707	SY	$	9.70	$	16,555
Place and compact asphalt	1,707	SY	$	7.75	$	13,227
Temporarily relocate businesses[2]	--	--		--		--
Total Cost					**$**	**38,353**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
Reservoir Leachate Collection Points				
Installation of leachate collection points (30 feet deep)	3	point	$ 1,050.00	$ 3,150
Total Cost				**$ 3,150**
Perimeter Passive Gas Control System				
Installation of biovent wells (25 feet deep)	49	well	$ 1,702.00	$ 83,398
Total Cost				**$ 83,398**
Soil Vapor Extraction systems in noncompliant areas (Areas 5, 7 and 8)				
Soil Vapor Extraction system	5	systems	$ 50,000.00	$ 250,000
Total Cost				**$ 250,000**
Contractor Mobilization/Demobilization				
Mob/demob	1	mob/demob	$ 19,040.00	$ 19,040
Total Cost				**$ 19,040**
Surface Water Controls				
Construct new catch basins	4	basin	$ 3,325.00	$ 13,300
Construct drainage swales	3,300	LF	$ 4.24	$ 14,003
Total Cost				**$ 27,303**
Stormwater Management				
Hay Bales	1,000	LF	$ 7.15	$ 7,150
Silt Fence	1,000	LF	$ 0.88	$ 880
Total Cost				**$ 8,030**
Building Engineering Controls				
Install Control System	4	system	$ 25,000.00	$ 100,000
Temporarily relocating existing building occupants	4	building	$ 10,000.00	$ 40,000
Total Cost				**$ 140,000**
			Subtotal	$ 3,829,973
Los Angeles City Cost Index (5.1%)				$ 195,329
			Subtotal	$ 4,025,302
Engineering, Permitting, Construction Management, Monitoring (25%)				$ 1,006,325
Institutional Controls	1	lump sum	$ 500,000.00	$ 500,000
		Total Direct Capital Costs		**$ 5,531,627**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
ANNUAL OM&M COSTS FOR ALTERNATIVE 3				
Asphalt cap over reservoir				$ 79,937
Gas Control System beneath asphalt cap				
first year sampling costs				$ 16,367
years 2-30 sampling costs				$ 66,372
replace standpipe once at 10 years				$ 620
replace standpipe once at 20 years				$ 529
Perimeter Passive Gas Control System Monitoring				
First year cost				$ 12,986
Years 2 through 30				$ 60,600
Asphalt Cap over Area 2 (not including reservoir)				$ 80,069
Gas Control System beneath asphalt cap				
first year sampling costs				$ 21,237
years 2-30 sampling costs				$ 96,672
replace standpipe once at 10 years				$ 620
replace standpipe once at 20 years				$ 529
Asphalt cap over areas outside Area 2				
Replace cap				$ 11,936
slurry seal at year 10				$ 3,202
slurry seal at year 20				$ 2,743
slurry seal at year 30				$ 2,362
Soil Vapor Extraction System				$ 500,000
Replace 20% of Existing Asphalt Cap outside Area 2 every 71/2 years				
7.5 years				$ 33,222
15 years				$ 25,667
22.5 years				$ 19,829
30 years				$ 15,321
Reservoir Leachate Collection Points				$ 65,034
Soil Gas Monitoring				$ 2,310,041
Ground Water Monitoring				$ 408,451
In-Business Air Monitoring				$ 469,365
Stormwater Monitoring				$ 275,881
Site Management				$ 110,352
Annual Reports				$ 183,920
Annual Shipping Costs				$ 36,784
Total OM&M present worth costs				$ 4,910,647
Total Cost including present worth of OM&M				**$ 10,442,274**

[1]Total Cost is subject to change during design.

[2]There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but it cannot be quantified at this time.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 4

CAPITAL COSTS

- Area to be capped by RCRA-equivalent cap is from the outside edge of the crest of the reservoir, i.e., a circular area with a diameter of 624 feet.
- The RCRA-equivalent cap will consist of, from the top down:
  - A 2-foot-thick vegetative layer.
  - A single-sided geocomposite drainage layer.
  - A 60-mil-thick HDPE geomembrane.
  - A single-sided geocomposite gas collection layer.
- Fill needs to be imported to establish the minimum 3 percent slope (recommended in EPA guidance documents) required for the cap. Existing grade is at approximately 2 percent slope. Imported fill is obtained for hauling cost only.
- Fine-grading of surface of foundation layer is included in calculation for excavating/consolidating waste material.
- Assume existing fill over Area 2 generally satisfies the performance standards for a monofill cap and some preparation is required to remove construction debris and contaminated soil.
- Fine-grading required for permanent drainage control and to tie-in to RCRA cap constructed over reservoir.
- Irrigation system and vegetation required in Area 2.
- An average of 1.5 feet of fill needs to be imported, placed and compacted in Area 2 outside the reservoir to achieve a minimum 3 percent grade (recommended in EPA guidance documents).
- Portions of Areas 4, 5 and 7, where sump-like material exists, are already capped with fill, pavement and/or structures which generally meet the performance requirements of a monofill cap. However, assume that 20 percent of this area requires upgrade and/or repair of the pavement. Upgrade will consist of construction of 4-inch-thick asphaltic concrete over 8-inch-thick crushed aggregate base course.
- Portions of Areas 4, 5 and 7 not covered by existing pavement or structures have existing fill which generally satisfies the performance standard for a monofill cap. All that these areas require are some preparation to remove construction debris and contaminated soil, fine-grading, installation of an irrigation system and vegetation.
- Demolished existing pavements are disposed of onsite in filled areas.
- There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but we cannot quantify it at this time.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 4
(Continued)

- An average of 1.5 feet of fill needs to be imported, placed and compacted in the capped areas outside Area 2 to achieve a minimum 3 percent grade (recommended in EPA guidance documents).
- Upper 3 feet of fill material in Areas 1, 6 and 8 will be excavated using scrapers and the lower 3.2 feet of fill material will be excavated using a backhoe due to softness of underlying sump-like material.
- Sump-like material in Areas 1, 6 and 8 will be excavated using a backhoe.
- One-half of fill material has to be double-handled.
- One-half of existing fill material will not be suitable for reuse and will have to be disposed in the reservoir under the cap.
- Based on the results of TM No. 12, at least some of the waste materials to be excavated are in a wet and soft condition. To facilitate consolidation of the wastes into the reservoir, it has been assumed that excavated waste will have to be stabilized with 2 percent by weight hydrated lime prior to compaction. The quantity of lime required for stabilization would be evaluated during the remedial design.
- Excavation health and safety-related costs are $20,000.
- Excavation cleanup confirmation sample-related costs are $10,000.
- A risk contingency equal to 50 percent is included to account for possible increases in waste excavation costs.
- Gas collection system under the reservoir cap is based on system included in April 1996 Remedial Design.
- Gas collection system under the reservoir cap is run for the first year as an active system then converted to a passive system.
- Treatment is required for extracted gas.
- A 2-horsepower, 50 scfm blower will be adequate for the proposed gas collection system under the reservoir cap. Blower will be mounted on a concrete slab and enclosed by a 10-foot x 10-foot metal building. The system would include monitoring points to assure that the system is developing a vacuum beneath the entire cap.
- Each reservoir leachate collection point will consist of 4-inch diameter PVC slotted and blank casing installed following standard ground water monitoring well procedures.
- Maximum depth of reservoir leachate collection point will be 30 feet.
- Dedicated pumps will not be installed in the reservoir leachate collection point.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 4
(Continued)

- Based on the results of the TM No. 13 Treatability Study, a maximum of three reservoir leachate collection points will be installed.
- Existing wells are extended an average of 5 feet.
- Existing wells to be abandoned average 25 feet deep.
- Existing wells within reservoir (39 wells) will be abandoned as discussed in Addendum 3 to TM No. 13. Existing wells outside of the reservoir (34) will be extended up through the new cap.
- New catch basins are required at four locations.
- Approximately 3,300 feet of storm drainage swales are required.
- The perimeter gas collection system consists of biovent wells some of which inject oxygen into the subsurface when high pressure atmospheric conditions exist and some of which vent soil gas when low pressure atmospheric conditions exist.
- The perimeter gas collection wells consist of 4-inch diameter perforated and solid PVC pipe.
- Bottoms of the perimeter gas collection wells are installed to 5 feet below the elevation of the bottom of the sump-like material. Locations, depths and operation of perimeter gas control wells would be established during the remedial design and may require additional data collection.
- Radius of influence of each perimeter gas collection well is 37 feet. Hence, wells are located on 74-foot centers.
- Perimeter gas collection wells are only required around the perimeter of areas containing sump-like material, where gas migration is known.
- SVE systems will be required at five noncompliance areas and each SVE system will consist of: six 25-foot-deep wells; 100 feet of PVC piping per well; and a 1.5 horsepower regenerative vacuum blower.
- Building engineering controls are required only for existing buildings which are constructed completely or partially over waste material, i.e., 9843 Greenleaf Avenue, and 12801, 12747 and 12637B Los Nietos Road.
- Control system will consist of cutting floor slab; installing vent pipe; repairing floor slab; and sealing floor slab at a cost of $25,000 per building.
- Gas will require treatment by an appropriate technology, e.g., filtering through a carbon canister, prior to discharge to the atmosphere.
- Systems can be converted from active systems to passive systems after first 5 years of operation.
- Existing building occupants will have to be temporarily relocated at a cost of $10,000 per building.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 4
(Continued)

- Construction is staged such that excavation of wastes occurs primarily during the dry season. A maximum of 2 inches of rain (approximately 10-percent of average annual) contacts 10 percent of the waste area to be exposed.
- The following total quantities of stormwater protective measures are required:
  - 1,000 lineal feet of hay bales.
  - 1,000 lineal feet of silt fence.
- Treated water is taken to an offsite industrial wastewater disposal facility and disposed at a cost of $0.25 per gallon.

O&M COSTS

RCRA-EQUIVALENT CAP

- Grass (305,660 ft^2) will be mowed once a year at a cost of $1.62/1,000 ft^2.
- Irrigation water assumes a usage of 1.5 inches/month over 670,700 ft^2 at a cost of $1.36/100 ft^3.
- The irrigation systems will need to be serviced once a year at a cost of $500/year.
- The irrigation system will need to be replaced at Year 15. $14,455 is the cost of the original system.
- Rodent control for the entire Site costs $2,000/year.

PASSIVE GAS CONTROL SYSTEM BENEATH RCRA CAP

- System is active for 1 year, then runs passively from Years 2 through 30.
- Cost for electricity to run blower is $1,500/year.
- Service for the blower will occur twice a month at $200/month.
- One sample will be collected each month for the first year and analyzed for the same constituents as the vapor wells.
- Equipment rental and labor costs are the same as the costs for the soil gas monitoring.
- After the first year, the system will be sampled once per quarter.
- It is assumed that the standpipe will have to be replaced twice during 30 years due to vandalism or other damage.

PERIMETER PASSIVE GAS CONTROL SYSTEM

- Sample eight wells each quarter for the first year.
- After the first year, sampling will occur annually.
- Sampling costs are the same as for the soil gas monitoring ($355/sample).
- Average time to collect one sample is approximately 1 hour. Technician cost is $65/hour.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 4
(Continued)

MONOFILL CAP AREA 2 (not including reservoir)

- Grass (315,940 ft^2) will be mowed once per year at a cost of $1.62/1,000 ft^2.
- Irrigation system will need to be replaced at Year 15. $14,491 is the cost of the original system.
- Irrigation system would need to be serviced once a year at a cost of $500/year.

LEACHATE COLLECTION POINTS

- Based on the results of the TM No. 13 Treatability Study and the anticipated decrease in the quantity of reservoir liquids following construction of the cap, the assumed cost for pumping and hauling to disposal facility is $659 per quarter. This price assumes 225 gallons, which is the minimum load accepted.
- Disposal fee is $1.00/gallon.

SOIL GAS MONITORING

- Seventy samples will be collected from the vapor wells around the perimeter and close to buildings on a quarterly basis. This number is based on the assumed postremediation configuration of the Site. It reflects a reduction from the number of samples currently being taken due to changes to the Site configuration (e.g., abandonment of some of the existing monitoring points) during remediation.
- The samples will be analyzed for methane and total nonmethane organics (EPA Method 25C) and VOCs (TO-15).
- EPA Method 25C costs $85/sample and Method TO-15 costs $225/sample.
- A $45/sample is charged for summa canister rental.
- Average time to collect one sample is approximately 1 hour.
- Technician cost is $65/hour.
- Equipment rental costs $2,000/quarter.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 4
(Continued)

IN-BUSINESS AIR MONITORING

- Fourteen samples will be collected for the onsite businesses on a quarterly basis.
- The samples will be analyzed for the same constituents as the vapor wells.
- The price for the tests is the same as for the soil gas monitoring.
- The samples are collected over a 24-hour period, but the average time for labor costs works out to be approximately 1 hour. Technician cost is $65/hour.
- Equipment rental costs $500/hour.

GROUND WATER MONITORING

- Eight samples will be sampled per quarter as discussed in the EPAs 1999 ground water report.
- VOCs and total recoverable metals will be analyzed each quarter. Costs for the tests are $135/sample and $125/sample, respectively.
- SVOCs and PCBs will be analyzed on a semiannual basis. Costs for the tests are $250/sample and $108/sample, respectively.
- Average time to collect one sample is 2 hours.
- Technician cost is $65/hour.
- Well development cost is $1,000/quarter.

STORMWATER MONITORING

- $15,000/year based on 1999 budget.

ANNUAL REPORTS

- Analytical data will be compiled into an annual report. Cost will be $10,000/year.

SHIPPING COSTS

- $2,000/year includes shipping all collected samples to laboratories.
- Replace 20 percent of asphalt every 7-1/2 years so that at the end of 30 years all of the asphalt has been replaced.
  - Use cutting, removal, hauling, disposal and compact subgrade and lay asphalt costs from direct cost table.

MONOFILL CAP ON AREAS 4, 5 AND 7

- Grass (49,100 ft^2) will be mowed once per year at $1.62/1,000 ft^2.
- Irrigation system will need to be replaced at Year 15. $2,322 is the cost of the original system.
- Irrigation system would need to be serviced once a year at a cost of $500/year.

Alternative 4				
DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
DIRECT CAPITAL COSTS				
RCRA-Equivalent Cap (305,660 SF)				
Site clearing	7	acre	$ 1,550.00	$ 10,876
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	3,736	CY	$ 16.51	$ 61,681
Grading slopes	305,660	SF	$ 0.02	$ 4,755
Geosynthetics	305,660	SF	$ 1.25	$ 382,075
Vegetative layer	22,642	CY	$ 5.89	$ 133,361
Irrigation System	1	system	$ 14,455.00	$ 14,455
Vegetate	305,660	SF	$ 0.05	$ 15,894
Wells to be abandoned	39	well	$ 875.00	$ 34,125
Wells to be extended	34	well	$ 99.75	$ 3,392
Total Cost				**$ 661,874**
Soil Gas Control beneath RCRA-Equivalent Cap				
Gas Collection System	1	system	$ 22,114.00	$ 22,114
Total Cost[1]				**$ 22,114**
Excavate Areas 1, 6 and 8 with Consolidation in Reservoir				
Remove and stockpile fill material over waste in reservoir	55,524	CY	$ 3.38	$ 187,671
Remove and stockpile top 3 feet fill material from Areas 1, 6 and 8	8,933	CY	$ 3.72	$ 33,215
Remove and stockpile bottom 3.2 feet fill material from Areas 1, 6 and 8	9,529	CY	$ 5.78	$ 55,030
Excavate waste from Areas 1, 6 and 8; haul to reservoir	8,447	CY	$ 5.78	$ 48,781
Place and compact waste in reservoir	8,447	CY	$ 7.65	$ 64,620
Hauling stockpiled fill into Areas 1, 6, 8 and over reservoir	18,497	CY	$ 2.73	$ 50,495
Compaction	44,820	CY	$ 1.64	$ 73,460
Fine grading	36,693	SY	$ 0.14	$ 5,137
Import fill	36,993	CY	$ 13.62	$ 503,845
Health and Safety	1	each	$ 20,000.00	$ 20,000
Cleanup Confirmation Sampling	1	each	$ 10,000.00	$ 10,000
			Subtotal	$ 1,052,254
Risk Contingency (50%)				526,127
Total Cost				**$ 1,578,381**
Monofill Area 2 not including reservoir (315,940 SF)				
Site clearing	7	acre	$ 1,550.00	$ 11,242
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	17,552	CY	$ 16.51	$ 289,784
Fine grading	315,940	SF	$ 0.03	$ 8,718
Irrigation System	1	system	$ 14,941.00	$ 14,941
Vegetate	315,940	SF	$ 0.05	$ 16,429
Total Cost				**$ 342,374**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
Monofill Areas 4, 5 and 7 (68,000 SF)				
Site clearing	2	acre	$ 1,550.00	$ 2,420
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	3,778	CY	$ 16.51	$ 62,375
Fine grading	68,000	SF	$ 0.03	$ 1,876
Irrigation System	1	system	$ 3,216.00	$ 3,216
Vegetate	68,000	SF	$ 0.05	$ 3,536
Temporarily relocate businesses[2]	--	--	--	--
Total Cost				**$ 74,683**
Paved areas to be repaired/upgraded (20% of 31,500 SF) in Areas 4, 5 and 7				
Cutting	240	LF	$ 1.15	$ 276
Removal	700	SY	$ 3.82	$ 2,674
Hauling	233	CY	$ 2.63	$ 614
Compact subgrade	117	CY	$ 0.45	$ 53
Place and compact aggregate base course	700	SY	$ 9.70	$ 6,790
Place and compact asphalt	700	SY	$ 7.75	$ 5,425
Temporarily relocate businesses[2]	--	--	--	--
Total Cost				**$ 15,831**
Reservoir Leachate Collection Points				
Installation of leachate collection points (30 feet deep)	3	points	$ 1,050.00	$ 3,150
Total Cost				**$ 3,150**
Perimeter Passive Gas Control System				
Installation of biovent wells (25 feet deep)	49	well	$ 1,702.00	$ 83,398
Total Cost				**$ 83,398**
Soil Vapor Extraction systems in noncompliant areas (Areas 5, 7 and 8)				
Soil Vapor Extraction system	5	systems	$ 50,000.00	$ 250,000
Total Cost				**$ 250,000**
Contractor Mobilization/Demobilization				
Mob/demob	1	mob/demob	$ 24,680.00	$ 24,680
Total Cost				**$ 24,680**
Surface Water Controls				
Construct new catch basins	4	basin	$ 3,325.00	$ 13,300
Construct drainage swales	3,300	LF	$ 4.24	$ 14,003
Total Cost				**$ 27,303**
Stormwater Management				
Hay Bales	1,000	LF	$ 7.15	$ 7,150
Silt Fence	1,000	LF	$ 0.88	$ 880
Storm water disposal	37,849	gallon	$ 0.25	$ 9,462
Total Cost				**$ 17,492**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT		TOTAL
Building Engineering Controls					
Install Control System	4	system	$ 25,000.00	$	100,000
Temporarily relocating existing building occupants	4	building	$ 10,000.00	$	40,000
Total Cost				**$**	**140,000**
			Subtotal	$	3,241,280
Los Angeles City Cost Index (5.1%)				$	165,305
			Subtotal	$	3,406,585
Engineering, Permitting, Construction Management, Monitoring (25%)				$	851,646
Institutional Controls	1	lump sum	$ 500,000.00	$	500,000
			Total Direct Capital Costs	**$**	**4,758,232**
ANNUAL OM&M COSTS FOR ALTERNATIVE 4					
RCRA-equivalent Cap over Reservoir				$	317,790
Gas Control System beneath RCRA cap					
first year sampling costs				$	16,367
years 2-30 sampling costs				$	66,372
replace standpipe once at 10 years				$	620
replace standpipe once at 20 years				$	529
Perimeter Passive Gas Control System Monitoring					
First year cost				$	12,986
Years 2 through 30				$	60,600
Monofill Cap Area 2				$	20,888
Replace 20% of Asphalt Cap every 71/2 years					
7.5 years				$	19,340
15 years				$	14,941
22.5 years				$	11,544
30 years				$	8,919
Monofill Cap outside Area 2 (Areas 4, 5 and 7)				$	4,492
Soil Vapor Extraction System				$	500,000
Reservoir Leachate Collection Points				$	65,034
Soil Gas Monitoring				$	2,310,041
Ground Water Monitoring				$	408,451
In-Business Air Monitoring				$	469,365
Stormwater Monitoring				$	275,881
Site Management				$	110,352
Annual Reports				$	183,920
Annual Shipping Costs				$	36,784
	Total OM&M present worth costs				$4,915,216
Total Cost including present worth of OM&M					**$9,673,448**

[1]Total Cost is subject to change during design.

[2]There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but it cannot be quantified at this time.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 5

CAPITAL COSTS

- Area to be capped by RCRA-equivalent cap is from the outside edge of the crest of the reservoir, i.e., a circular area with a diameter of 624 feet.
- The RCRA-equivalent cap will consist of, from the top down:
  - A 2-foot-thick vegetative layer.
  - A single-sided geocomposite drainage layer.
  - A 60-mil-thick HDPE geomembrane.
  - A single-sided geocomposite gas collection layer.
- Fill needs to be imported to establish the minimum 3 percent slope (recommended in EPA guidance documents) required for the cap. Existing grade is at approximately 2 percent slope. Imported fill is obtained for hauling cost.
- Fine-grading of surface of foundation layer is included in calculation for excavating/consolidating waste material.
- Waste excavations done using an excavator.
- One-half of excavated fill material has to be double-handled.
- Shoring not required.
- One-half of existing fill material will not be suitable for reuse and will have to be disposed under the reservoir cap.
- Based on the results of TM No. 12, at least some of the waste materials to be excavated are in a wet and soft condition. To facilitate consolidation of the wastes into the reservoir, it has been assumed that excavated waste will have to be stabilized with 2 percent by weight hydrated lime prior to compaction. The quantity of lime required for stabilization would be evaluated during the remedial design.
- Health and safety costs are $20,000.
- Cleanup confirmation sample costs are $10,000.
- A risk contingency of 50 percent is included to account for possible increases in waste excavation costs.
- Assume existing fill over Area 2 generally satisfies the performance standards for a monofill cap and some preparation is required to remove construction debris and contaminated soil.
- Fine-grading required for permanent drainage control and to tie-in to RCRA cap constructed over reservoir.
- Irrigation system and vegetation required.
- An average of 1.5 feet of fill needs to be imported, placed and compacted in Area 2 outside the reservoir to achieve a minimum 3 percent grade (recommended in EPA guidance documents).

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 5
(Continued)

- Portions of Areas 1, 4, 5, 6, 7 and 8, where sump-like material exists, are already capped with pavement and/or structures which generally meet the performance requirements of a monofill cap. However, assume that 20 percent of this area requires upgrade and/or repair of the pavement. Upgrade will consist of construction of 4-inch-thick asphaltic concrete over 8-inch-thick crushed aggregate base course.
- Portions of the areas outside Area 2 not covered by existing pavement or structures have existing fill which generally satisfies the performance standard for a monofill cap. All that these areas require are some preparation to remove construction debris and contaminated soil, fine-grading, installation of an irrigation system and vegetation.
- Demolished existing pavements are disposed of onsite in one of the fill areas.
- There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but we cannot quantify it at this time.
- An average of 1.5 feet of fill needs to be imported, placed and compacted in the capped areas outside Area 2 to achieve a minimum 3 percent grade (recommended in EPA guidance documents).
- Gas collection system under the reservoir cap is based on system included in April 1996 Remedial Design.
- Gas collection system under the reservoir cap is run for the first year as an active system then converted to a passive system.
- Treatment is required for extracted gas.
- A 2-horsepower, 50 scfm blower will be adequate for the proposed gas collection system under the reservoir cap. Blower will be mounted on a concrete slab and enclosed by a 10-foot x 10-foot metal building. The system would include monitoring points to assure that the system is developing a vacuum beneath the entire cap.
- Each reservoir leachate collection point will consist of 4-inch diameter PVC slotted and blank casing installed following standard ground water monitoring well procedures.
- Maximum depth of reservoir leachate collection point will be 30 feet.
- Dedicated pumps will not be installed in the reservoir leachate collection point.
- Based on the results of the TM No. 13 Treatability Study, a maximum of three reservoir leachate collection points will be installed.
- Existing wells are extended an average of 5 feet.
- Existing wells to be abandoned average 25 feet deep.

ASSUMPTIONS FOR COST ESTIMATES ALTERNATIVE 5

(Continued)

- Existing wells within reservoir (39 wells) will be abandoned as discussed in Addendum 3 to TM No. 13. Existing wells outside of the reservoir (34) will be extended up through the new cap.
- New catch basins are required at four locations.
- Approximately 3,300 feet of storm drainage swales are required.
- Building engineering controls are required only for existing buildings which are constructed completely or partially over waste material, i.e., 9843 Greenleaf Avenue, and 12801, 12747 and 12637B Los Nietos Road.
- Control system will consist of cutting floor slab; installing vent pipe; repairing floor slab; and sealing floor slab at a cost of $25,000 per building.
- Gas will require treatment by an appropriate technology, e.g., filtering through a carbon canister, prior to discharge to the atmosphere.
- Systems can be converted from active systems to passive systems after first 5 years of operation.
- Existing building occupants will have to be temporarily relocated at a cost of $10,000 per building.
- The perimeter gas collection system consists of biovent wells some of which inject oxygen into the subsurface when high pressure atmospheric conditions exist and some of which vent soil gas when low pressure atmospheric conditions exist.
- The perimeter gas collection wells consist of 4-inch diameter perforated and solid PVC pipe.
- Bottoms of the perimeter gas collection wells are installed to 5 feet below the elevation of the bottom of the sump-like material. Locations, depths and operation of perimeter gas control wells would be established during the remedial design and may require additional data collection.
- Radius of influence of each perimeter gas collection well is 37 feet. Hence, wells are located on 74-foot centers.
- The perimeter gas collection wells are required around the perimeter of areas containing sump-like material, where gas migration is known.
- Construction is staged such that excavation of wastes occurs primarily during the dry season. A maximum of 2 inches of rain (approximately 10 percent of average annual) contacts 10 percent of the waste area to be exposed.
- The following total quantities of stormwater protective measures are required:
  - 1,000 lineal feet of hay bales.
  - 1,000 lineal feet of silt fence.
- Treated water is taken to an offsite industrial wastewater disposal facility and disposed at a cost of $0.25 per gallon.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 5
(Continued)

O&M COSTS

RCRA - EQUIVALENT CAP

- Grass (305,660 ft^2) will be mowed once a year at a cost of $1.62/1,000 ft^2.
- Irrigation water assumes a usage of 1.5 inches/month over 689,600 ft^2 at a cost of $1.36/100 ft^3.
- The irrigation systems will need to be serviced once a year at a cost of $500/year.
- The irrigation system will need to be replaced at Year 15. $14,455 is the cost of the original system.
- Rodent control for the entire Site costs $2,000/year.

PASSIVE GAS CONTROL SYSTEM BENEATH RCRA CAP

- System is active for 1 year, then runs passively from Years 2 through 30.
- Cost for electricity to run blower is $1,500/year.
- Service for the blower will occur twice a month at $200/month.
- One sample will be collected each month for the first year and analyzed for the same constituents as the vapor wells.
- Equipment rental and labor costs are the same as the costs for the soil gas monitoring.
- After the first year, the system will be sampled once per quarter.
- It is assumed that the standpipe will have to be replaced twice during 30 years due to vandalism or other damage.

PERIMETER PASSIVE GAS CONTROL SYSTEM

- Sample eight wells each quarter for the first year.
- After the first year, sampling will occur annually.
- Sampling costs are the same as for the soil gas monitoring ($355/sample).
- Average time to collect one sample is approximately 1 hour. Technician cost is $65/hour.

MONOFILL CAP AREA 2 (not including reservoir)

- Grass (315,940 ft^2) will be mowed once per year at a cost of $1.62/1,000 ft^2.
- Irrigation system will need to be replaced at Year 15. $14,491 is the cost of the original system.
- Irrigation system would need to be serviced once a year at a cost of $500/year.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 5
(Continued)

LEACHATE COLLECTION POINTS

- Based on the results of the TM No. 13 Treatability Study and the anticipated decrease in the quantity of reservoir liquids following construction of the cap, the assumed cost for pumping and hauling to disposal facility is $659 per quarter. This price assumes 225 gallons, which is the minimum load accepted.
- Disposal fee is $1.00/gallon.

SOIL GAS MONITORING

- Seventy samples will be collected from the vapor wells around the perimeter and close to buildings on a quarterly basis. This number is based on the assumed postremediation configuration of the Site. It reflects a reduction from the number of samples currently being taken due to changes to the Site configuration (e.g., abandonment of some of the existing monitoring points) during remediation.
- The samples will be analyzed for methane and total nonmethane organics (EPA Method 25C) and VOCs (TO-15).
- EPA Method 25C costs $85/sample and Method TO-15 costs $225/sample.
- A $45/sample is charged for summa canister rental.
- Average time to collect one sample is approximately 1 hour.
- Technician cost is $65/hour.
- Equipment rental costs $2,000/quarter.

IN-BUSINESS AIR MONITORING

- Fourteen samples will be collected for the onsite businesses on a quarterly basis.
- The samples will be analyzed for the same constituents as the vapor wells.
- The price for the tests is the same as for the soil gas monitoring.
- The samples are collected over a 24-hour period, but the average time for labor costs works out to be approximately 1 hour. Technician cost is $65/hour.
- Equipment rental costs $500/hour.

GROUND WATER MONITORING

- Eight samples will be sampled per quarter as discussed in the EPAs 1999 ground water report.
- VOCs and total recoverable metals will be analyzed each quarter. Costs for the tests are $135/sample and $125/sample respectively.
- SVOCs and PCBs will be analyzed on a semi-annual basis. Costs for the tests are $250/sample and $108/sample respectively.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 5
(Continued)

- Average time to collect one sample is 2 hours.
- Technician cost is $65/hour.
- Well development cost is $1,000/quarter.

STORMWATER MONITORING

- $15,000/year based on 1999 budget.

ANNUAL REPORTS

- Analytical data will be compiled into an annual report. Cost will be $10,000/year.

SHIPPING COSTS

- $2,000/year includes shipping the collected samples to laboratories.

MONOFILL CAP IN AREAS 1, 4, 5, 6, 7 AND 8

- Grass (68,000 ft^2) will be mowed once a year at a cost of $1.62/1,000 ft^2.
- The irrigation system will need to be replaced at Year 15. $3,216 is the cost of the original system.
- Irrigation system would need to be serviced once a year at a cost of $500/year.

Alternative 5				
DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
DIRECT CAPITAL COSTS				
RCRA-Equivalent Cap (305,660 SF)				
Site clearing	7	acre	$ 1,550.00	$ 10,876
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	32,760	CY	$ 16.51	$ 540,868
Grading slopes	305,660	SF	$ 0.02	$ 4,755
Geosynthetics	305,660	SF	$ 1.25	$ 382,075
Vegetative layer	22,642	CY	$ 5.89	$ 133,361
Irrigation System	1	system	$ 14,455.00	$ 14,455
Vegetate	305,660	SF	$ 0.05	$ 15,894
Wells to be abandoned	39	well	$ 875.00	$ 34,125
Wells to be extended	34	well	$ 99.75	$ 3,392
Total Cost				**$ 1,141,060**
Soil Gas Control beneath RCRA-Equivalent Cap				
Gas Collection System	1	system	$ 22,114.00	$ 22,114
Total Cost[1]				**$ 22,114**
Excavate waste adjacent to buildings with consolidation in reservoir				
Remove and stockpile fill material next to buildings.	1,295	CY	$ 5.25	$ 6,799
Excavate waste from next to buildings; haul to reservoir	1,928	CY	$ 5.25	$ 10,122
Place and compact waste in reservoir	1,928	CY	$ 7.65	$ 14,749
Hauling stockpiled fill next to buildings	648	CY	$ 2.73	$ 1,769
Compaction	1,295	CY	$ 1.49	$ 1,930
Fine grading	627	SY	$ 0.14	$ 88
Import fill	2,576	CY	$ 13.62	$ 35,085
Health and Safety	1	each	$ 20,000.00	$ 20,000
Cleanup Confirmation Sampling	1	each	$ 10,000.00	$ 10,000
			Subtotal	$ 100,541
Risk Contingency (50%)				50,271
Total Cost				**$ 150,812**
Monofill Area 2 not including reservoir (315,940 SF)				
Site clearing	7	acre	$ 1,550.00	$ 11,242
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	17,552	CY	$ 16.51	$ 289,784
Fine grading	315,940	SF	$ 0.03	$ 8,718
Irrigation System	1	system	$ 14,941.00	$ 14,941
Vegetate	315,940	SF	$ 0.05	$ 16,429
Total Cost				**$ 342,374**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
Monofill Areas 4, portion of 5 and 7 (62,500 SF)				
Site clearing	1.4	acre	$ 1,550.00	$ 2,195
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	3,472	CY	$ 16.51	$ 57,326
Fine grading	62,500	SF	$ 0.03	$ 1,725
Irrigation System	1	system	$ 3,216.00	$ 3,216
Vegetate	62,500	SF	$ 0.05	$ 3,250
Temporarily relocate businesses[2]	--	--	--	--
Total Cost				**$ 68,972**
Monofill Areas 1, 6 and 8 (36,018 SF)				
Site clearing	0.83	acre	$ 1,550.00	$ 1,282
Rubbish handling and loading	20	CY	$ 33.00	$ 660
Disposal fee	30	ton	$ 20.00	$ 600
Import Fill	2,001	CY	$ 16.51	$ 33,037
Fine grading	36,018	SF	$ 0.03	$ 994
Irrigation System	1	system	$ 3,216.00	$ 3,216
Vegetate	36,018	SF	$ 0.05	$ 1,873
Total Cost				**$ 41,661**
Paved areas to be repaired/upgraded (20% of 76,000 SF) in Areas 1, 4, 5 , 6, 7, and 8				
Cutting	585	LF	$ 1.15	$ 672
Removal	1,706	SY	$ 3.82	$ 6,516
Hauling	568	CY	$ 2.63	$ 1,493
Compact subgrade	285	CY	$ 0.45	$ 128
Place and compact aggregate base course	1,706	SY	$ 9.70	$ 16,546
Place and compact asphalt	1,706	SY	$ 7.75	$ 13,220
Temporarily relocate businesses[2]	--	--	--	--
Total Cost				**$ 38,575**
Reservoir Leachate Collection Points				
Installation of leachate collection points (30 feet deep)	3	points	$ 1,050.00	$ 3,150
Total Cost				**$ 3,150**
Perimeter Passive Gas Control System				
Installation of biovent wells (25 feet deep)	57	well	$ 1,702	$ 97,014
Total Cost				**$ 97,014**
Contractor Mobilization/Demobilization				
Mob/demob	1	mob/demob	$ 24,680.00	$ 24,680
Total Cost				**$ 24,680**

DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
Surface Water Controls				
Construct new catch basins	4	basin	$ 3,325.00	$ 13,300
Construct drainage swales	3,300	LF	$ 4.24	$ 14,003
Total Cost				$ 27,303
Stormwater Management				
Hay Bales	1,000	LF	$ 7.15	$ 7,150
Silt Fence	1,000	LF	$ 0.88	$ 880
Storm water disposal	37,849	gallon	$ 0.25	$ 9,462
Total Cost				$ 17,492
Building Engineering Controls				
Install Control System	4	system	$ 25,000.00	$ 100,000
Temporarily relocating existing building occupants	4	building	$ 10,000.00	$ 40,000
Total Cost				$ 140,000
			Subtotal	$ 2,115,207
Los Angeles City Cost Index (5.1%)				$ 107,876
			Subtotal	$ 2,223,082
Engineering, Permitting, Construction Management, Monitoring (25%)				$ 555,771
Institutional Controls	1	lump sum	$ 500,000.00	$ 500,000
			Total Direct Capital Costs	**$ 3,278,853**
ANNUAL OM&M COSTS FOR ALTERNATIVE 5				
RCRA-equivalent Cap				$ 324,926
Gas Control System beneath RCRA cap				
first year sampling costs				$ 16,367
years 2-30 sampling costs				$ 66,372
replace standpipe once at 10 years				$ 620
replace standpipe once at 20 years				$ 529
Perimeter Passive Gas Control System Monitoring				
First year cost				$ 12,986
Years 2 through 30				$ 60,600
Monofill cap over Area 2 not including reservoir				$ 20,888
Monofill cap in Areas 4, 5 and 7				$ 4,492
Monofill cap in Areas 1, 6 and 8				$ 2,797
Reservoir Leachate Collection Points				$ 65,034
Soil Gas Monitoring				$ 2,310,041
Ground Water Monitoring				$ 408,451
In-Business Air Monitoring				$ 469,365
Stormwater Monitoring				$ 275,881
Site Management				$ 110,352
Annual Reports				$ 183,920
Annual Shipping Costs				$ 36,784
Total OM&M present worth costs				$ 4,370,402
Total Cost including present worth of OM&M				**$ 7,649,255**

[1]Total Cost is subject to change during design.

[2]There will be some cost associated with temporarily relocating occupants whose properties will be significantly affected by the remedial construction, but it cannot be quantified at this time.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 6

CAPITAL COSTS

- Area to be capped is the majority of Area 2, i.e., an area 840 feet x 740 feet.
- The RCRA-equivalent cap will consist of, from the top down:
  - A 2-foot-thick vegetative layer.
  - A single-sided geocomposite drainage layer.
  - A 60-mil-thick HDPE geomembrane.
  - A single-sided geocomposite gas collection layer.
- Fill does not need to be imported to establish the minimum 3 percent slope (recommended in EPA guidance documents) required for the cap, due to the volume of waste to be excavated and consolidated in Area 2.
- Fine-grading of surface of foundation layer is included in calculation for excavating/consolidating waste material.
- Upper 3 feet of fill material will be excavated using scrapers and lower 3.2 feet will be excavated using a backhoe due to softness of underlying waste material.
- Waste material outside reservoir will be excavated using a backhoe.
- One-half of fill material has to be double handled.
- Only one-half of fill material is reusable. Rest must be disposed of onsite as nonhazardous waste.
- Average depth of fill material is 6.2 feet.
- One coy of waste weighs 1.5 tons.
- Site to be restored to approximately the preexcavation grades.
- Imported fill is obtained for hauling cost only.
- Four buildings underlain by waste will have to be demolished.
- Health and safety related costs are $350,000.
- Site security related costs are $100,000.
- Remedied areas will have to be provided with an irrigation system.
- Stormwater control costs during remediation are $100,000.
- Liquid waste encountered during excavation will cost $250,000 to manage.
- A risk contingency equal to 50 percent is included to account for possible increases in waste excavation costs.

ASSUMPTIONS FOR COST ESTIMATES ALTERNATIVE 6

(Continued)

- Complete demolition of buildings at:
  - **8943 Greenleaf Avenue** - 40 ft. x 140 ft. metal building. Wall height 16 ft. Flat roof, 102,400 cf interior volume. Assume no interior walls. Concrete slab on grade. Assume shallow spread concrete footings.
  - **12637B Los Nietos Road** - 40 ft. x 160 ft. concrete block building. Wall height 16 ft. Flat roof, 102,400 cf interior volume. Assume no interior walls. Concrete slab on grade. Assume shallow spread concrete footings.
  - **12747 and 12801 Los Nietos Road** -

    A. (40 ft. x 72 ft.) + (24 ft. x 44 ft) x 16 ft. wall height. Flat roof, 62,976 cf interior volume. Assume no interior walls, concrete slab on grade and shallow spread concrete footings, concrete block construction for both buildings.

    B. (40 ft. x 164 ft.) + (20 ft. x 20 ft) x 16 ft. wall height. Flat roof, 111,360 cf interior volume.
- Masonry and concrete are disposed onsite.
- Asbestos or other hazardous materials will not be disposed of from building demolition.
- Each reservoir leachate collection point will consist of 4-inch-diameter PVC slotted and blank casing installed following standard ground water monitoring well procedures.
- Maximum depth of reservoir leachate collection points will be 30 feet.
- Dedicated pumps will not be installed in the reservoir leachate collection point.
- Based on the results of the TM No. 13 Treatability Study, a maximum of three reservoir leachate collection points will be installed.
- Gas collection system under the reservoir cap is based on system included in April 1996 Remedial Design.
- Gas collection system under the reservoir cap is run for the first year as an active system then converted to a passive system.
- Treatment is required for extracted gas.
- A 2-horsepower, 50 scfm blower will be adequate for the proposed gas collection system cap. Blower will be mounted on a concrete slab and enclosed by a 10-foot x 10-foot metal building. The system would include monitoring points to assure that the system is developing a vacuum beneath the entire cap.
- The perimeter gas collection system consists of biovent wells some of which inject oxygen into the subsurface when high pressure atmospheric conditions exist and some of which vent soil gas when low pressure atmospheric conditions exist.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 6
(Continued)

- The perimeter gas collection wells consist of 4-inch diameter perforated and solid PVC pipe.
- Bottoms of the perimeter gas collection wells are installed to 5 feet below the elevation of the bottom of the sump-like material. Locations, depths and operation of perimeter gas control wells would be established during the remedial design and may require additional data collection.
- Radius of influence of each perimeter gas collection well is 37 feet. Hence, wells are located on 74-foot centers.
- The perimeter gas collection wells are only required around the perimeter of areas containing sump-like material, where gas migration is known.
- New catch basins are required at four locations.
- Approximately 3,300 feet of storm drainage swales are required.
- The following total quantities of stormwater protective measures are required:
  - 1,000 lineal feet of hay bales.
  - 1,000 lineal feet of silt fence.

O&M COSTS

RCRA-EQUIVALENT CAP

- Grass will be mowed once a year at a cost of $1.62/1,000 ft^2.
- Irrigation water assumes a usage of 1.5 inches/month over 731,100 ft^2 at a cost of $1.36/100 ft^3.
- All irrigation systems will need to be services once a year at a cost of $500/year.
- The irrigation system will need to be replaced at Year 15. $14,455 is the cost of the original system.
- Rodent control for the entire Site costs $2,000/year.

PASSIVE GAS CONTROL SYSTEM BENEATH RCRA CAP

- System is active for 1 year, then runs passively from Years 2 through 30.
- Cost for electricity to run blower is $1,500/year.
- Service for the blower will occur twice a month at $200/month.
- One sample will be collected each month for the first year and analyzed for the same constituents as the vapor wells.
- Equipment rental and labor costs are the same as the costs for the soil gas monitoring.
- After the first year, the system will be sampled once per quarter.
- It is assumed that the standpipe will have to be replaced twice during 30 years due to vandalism or other damage.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 6
(Continued)

PERIMETER PASSIVE GAS CONTROL SYSTEM

- Sample eight wells each quarter for the first year.
- After the first year, sampling will occur annually.
- Sampling costs are the same as for the soil gas monitoring ($355/sample).
- Average time to collect one sample is approximately 1 hour. Technician cost is $65/hour.

LEACHATE COLLECTION POINTS

- Based on the results of the TM No. 13 Treatability Study and the anticipated decrease in the quantity of reservoir liquids following construction of the cap, the assumed cost for pumping and hauling to disposal facility is $659 per quarter. This price assumes 225 gallons, which is the minimum load accepted.
- Disposal fee is $1.00/gallon.

SOIL GAS MONITORING

- Seventy samples will be collected from the vapor wells around the perimeter and close to buildings on a quarterly basis. This number is based on the assumed postremediation configuration of the Site. It reflects a reduction from the number of samples currently being taken due to changes to the Site configuration (e.g., abandonment of some of the existing monitoring points) during remediation.
- The samples will be analyzed for methane and total nonmethane organics (EPA Method 25C) and VOCs (TO-15).
- EPA Method 25C costs $85/sample and Method TO-15 costs $225/sample.
- $45/sample is charged for summa canister rental.
- Average time to collect one sample is approximately 1 hour.
- Technician cost is $65/hour.
- Equipment rental costs $2,000/quarter.

IN-BUSINESS AIR MONITORING

- Fourteen samples will be collected for the onsite businesses on a quarterly basis.
- The samples will be analyzed for the same constituents as the vapor wells.
- The price for the tests is the same as for the soil gas monitoring.
- The samples are collected over a 24-hour period, but the average time for labor costs works out to be approximately 1 hour. Technician cost is $65/hour.
- Equipment rental costs $500/hour.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 6
(Continued)

GROUND WATER MONITORING

- Eight samples will be sampled per quarter as discussed in the EPAs 1999 ground water report.
- VOCs and total recoverable metals will be analyzed each quarter. Costs for the tests are $135/sample and $125/sample, respectively.
- SVOCs and PCBs will be analyzed on a semiannual basis. Costs for the tests are $250/sample and $108/sample, respectively.
- Average time to collect one sample is 2 hours.
- Technician cost is $65/hour.
- Well development cost is $1,000/quarter.

STORMWATER MONITORING

- $15,000/year based on 1999 budget.

SITE MANAGEMENT

- $6,000/year based on 1999 budget.

ANNUAL REPORTS

- Analytical data will be compiled into an annual report. Cost will be $10,000/year.

SHIPPING COSTS

- $2,000/year includes shipping the collected samples to laboratories.

Alternative 6					
DESCRIPTION	QUANTITY	UNIT	COST/UNIT		TOTAL
DIRECT CAPITAL COSTS					
RCRA-Equivalent Cap (621,600 SF)					
Site clearing	7	acre	$ 1,550.00	$	10,876
Rubbish handling and loading	20	CY	$ 33.00	$	660
Disposal fee	30	ton	$ 20.00	$	600
Grading slopes	621,600	SF	$ 0.02	$	9,670
Geosynthetics	621,600	SF	$ 1.25	$	777,000
Vegetative layer	46,044	CY	$ 5.89	$	271,198
Irrigation System	1	system	$ 29,396.00	$	29,396
Vegetate	621,600	SF	$ 0.05	$	32,323
Wells to be abandoned	39	well	$ 875.00	$	34,125
Wells to be extended	34	well	$ 99.75	$	3,392
Total Cost				**$**	**1,169,240**
Soil Gas Control beneath RCRA-Equivalent Cap					
Gas Collection System	1	system	$ 22,114.00	$	22,114
Total Cost'				**$**	**22,114**
Excavate Waste from areas 1,4,5,6,7, 8 and west corner of Area 2 (174,700 SF)					
Remove upper 3 feet of fill material	19,411	CY	$ 3.38	$	65,609
Remove lower 3.2 feet of fill material	20,705	CY	$ 5.25	$	108,701
Excavate non-reservoir waste and load onto trucks	54,469	CY	$ 5.78	$	314,831
Hauling stockpiled fill into Areas 1,4,5, 6, 7, and 8	20,058	CY	$ 2.73	$	54,758
Compaction	20,058	CY	$ 1.49	$	29,886
Fine grading	19,411	SY	$ 0.14	$	2,718
Import fill	74,527	CY	$ 16.51	$	1,230,441
Building Demolition	1	lump sum	$ 210,317.00	$	210,317
Health and Safety	1	each	$ 350,000.00	$	350,000
Miscellaneous Costs	1	each	$ 466,473.00	$	466,473
			Subtotal	$	2,833,734
Risk Contingency (50%)					1,416,867
Total Cost				**$**	**4,250,601**
Reservoir Leachate Collection Points					
Installation of leachate collection points (30 feet deep)	3	points	$ 1,050.00	$	3,150
Total Cost				**$**	**3,150**
Perimeter Passive Gas Control System					
Installation of biovent wells (25 feet deep)	43	well	$ 1,702.00	$	73,186
Total Cost				**$**	**73,186**
Contractor Mobilization/Demobilization					
Mob/demob	1	mob/demob	$ 24,680.00	$	24,680
Total Cost				**$**	**24,680**
Surface Water Controls					
Construct new catch basins	4	basin	$ 3,325.00	$	13,300
Construct drainage swales	3,300	LF	$ 4.24	$	14,003
Total Cost				**$**	**27,303**
Stormwater Management					
Hay Bales	1,000	LF	$ 7.15	$	7,150
Silt Fence	1,000	LF	$ 0.88	$	880
Stormwater Treatment	21,836	Gallon	$ 0.25	$	5,459
Total Cost				**$**	**13,489**
			Subtotal	$	5,583,763

DESCRIPTION	QUANTITY	UNIT	COST/UNIT		TOTAL
Los Angeles City Cost Index (5.1%)				$	284,772
			Subtotal	$	5,868,535
Engineering, Permitting, Construction Management, Monitoring (25%)				$	1,467,134
Institutional Controls	1	lump sum	$ 500,000	$	500,000
			Total Direct Capital Costs	**$**	**7,835,669**
ANNUAL OM&M COSTS FOR ALTERNATIVE 6					
RCRA-equivalent Cap				$	340,743
Gas Control System beneath RCRA cap					
first year sampling costs				$	16,367
years 2-30 sampling costs				$	66,372
replace standpipe once at 10 years				$	620
replace standpipe once at 20 years				$	529
Perimeter Passive Gas Control System Monitoring					
First year cost				$	8,216
Years 2 through 30				$	38,339
RCRA-equivalent Cap over Area 2 not including reservoir				$	352,203
Reservoir Leachate Collection Points				$	65,034
Soil Gas Monitoring				$	2,310,041
Ground Water Monitoring				$	408,451
Stormwater Monitoring				$	275,881
Site Management				$	110,352
Annual Reports				$	183,920
Annual Shipping Costs				$	36,784
			Total OM&M present worth costs	$	4,213,852
			Total Cost including present worth of OM&M	**$**	**12,049,521**

[1]Total Cost is subject to change during design.

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 7

CAPITAL COSTS

- There are not capital costs for Alternative 7.

GROUND WATER MONITORING

- Eight samples will be sampled per quarter as discussed in the EPAs 1999 ground water report.
- VOCs and total recoverable metals will be analyzed each quarter. Costs for the tests are $135/sample and $125/sample, respectively.
- SVOCs and PCBs will be analyzed on a semiannual basis. Costs for the tests are $250/sample and $108/sample, respectively.
- Average time to collect one sample is 2 hours.
- Technician cost is $65/hour.
- Well development cost is $1,000/quarter.

ANNUAL REPORTS

- Analytical data will be compiled into an annual report. Cost will be $10,000/year.

SHIPPING COSTS

- $2,000/year includes shipping the collected samples to laboratories.

Alternative 7					
DESCRIPTION	QUANTITY	UNIT	COST/UNIT		TOTAL
NO DIRECT CAPITAL COSTS					
Current monitoring programs continue					
			Subtotal	$	-
Los Angeles City Cost Index (5.1%)				$	-
			Subtotal	$	-
Engineering, Permitting, Construction Management, Monitoring (25%)				$	-
			Total Direct Capital Costs	**$**	**-**
ANNUAL OM&M COSTS FOR ALTERNATIVE 7					
Ground Water Monitoring				$	408,451
Annual Reports				$	183,920
Annual Shipping Costs				$	36,784
			Total OM&M present worth costs		$629,155
			Total Cost including direct costs and present worth of OM&M		**$629,155**

ASSUMPTIONS FOR COST ESTIMATES
ALTERNATIVE 8

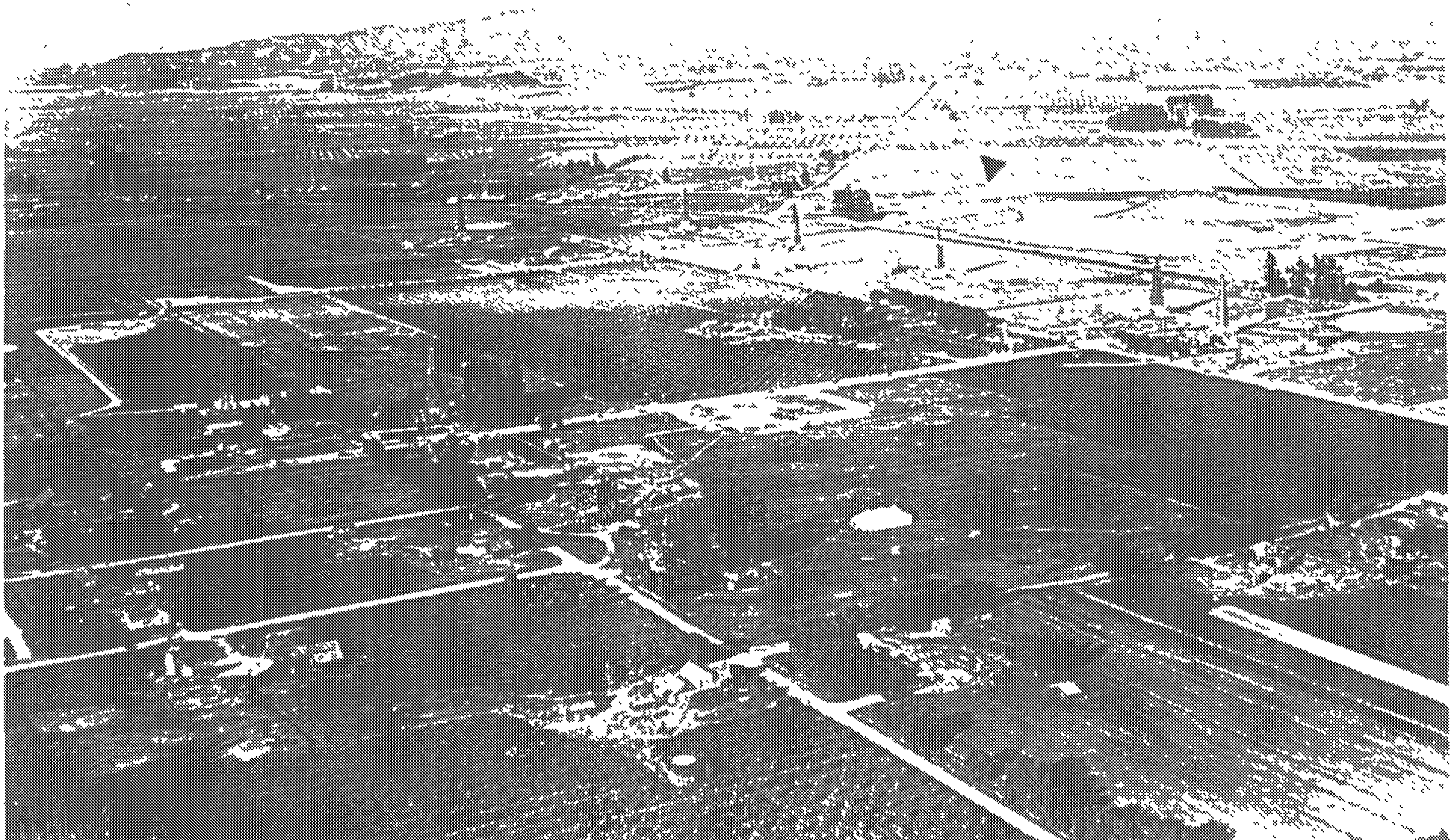
CAPITAL COSTS

- Area underlain by contaminated ground water equals 485,000 ft^2.
- Zone of contamination extends from first ground water to elevation 20, i.e., 100 feet saturated thickness.
- Average specific yield of formation is 0.28.
- Ten pore volumes of water will have to be extracted and treated to achieve MCLs.
- Wells will produce 10 gallons per day per well.
- Radius of influence of each well is 100 feet.
- Treated water is disposed of to injection wells along the Site perimeter to create an inward hydraulic gradient.
- Carbon usage rate of 15 pounds per day.
- For those properties where businesses will be interrupted by construction of the ground water remediation system, assume legal transaction costs are $50,000 per business based on October 1, 1999 memo, for evaluation of Area 8 development economics.
- Will impact 11 businesses.

O&M COSTS

- System runs for approximately 14 years.
- Electricity unit rate for running compressor is $0.1/kw-Hr.
- Refurbish compressors every 5 years at a cost of $1,500 per event per compressor.
- Refurbish pumps every 3 years at a cost of $300/pump times 14 pumps every 3 years.
- Change carbon every 3 or 4 years at a cost of $4,000 per change.
- Check or service system. Technician spends 1 day per week checking or servicing the system.

Alternative 8				
DESCRIPTION	QUANTITY	UNIT	COST/UNIT	TOTAL
DIRECT CAPITAL COSTS				
Pump and Treat Ground Water				
Construct extraction wells	14	well	$ 12,000.00	$ 168,000
Construct injection wells	9	well	$ 12,555.56	$ 113,000
Piping system	1	system	$ 181,000.00	$ 181,000
Extraction pumps	14	pump	$ 4,714.29	$ 66,000
Compressors	14	compressor	$ 2,000.00	$ 28,000
Treatment plant	1	system	$ 59,000.00	$ 59,000
Transactional costs	1	cost	$ 550,000.00	$ 550,000
Total Cost				**$ 1,165,000**
			Subtotal	$ 1,165,000
Los Angeles City Cost Index (5.1%)				$ 59,415
			Subtotal	$ 1,224,415
Engineering, Permitting, Construction Management, Monitoring (25%)				$ 306,104
			Total Direct Capital Costs	**$ 1,530,519**
ANNUAL OM&M COSTS FOR ALTERNATIVE 8				
Ground Water Monitoring				$ 408,451
Pump and Treat Ground Water				$ 880,000
			Total OM&M present worth costs	$ 1,288,451
			Total Cost including present worth of OM&M	**$ 2,818,970**



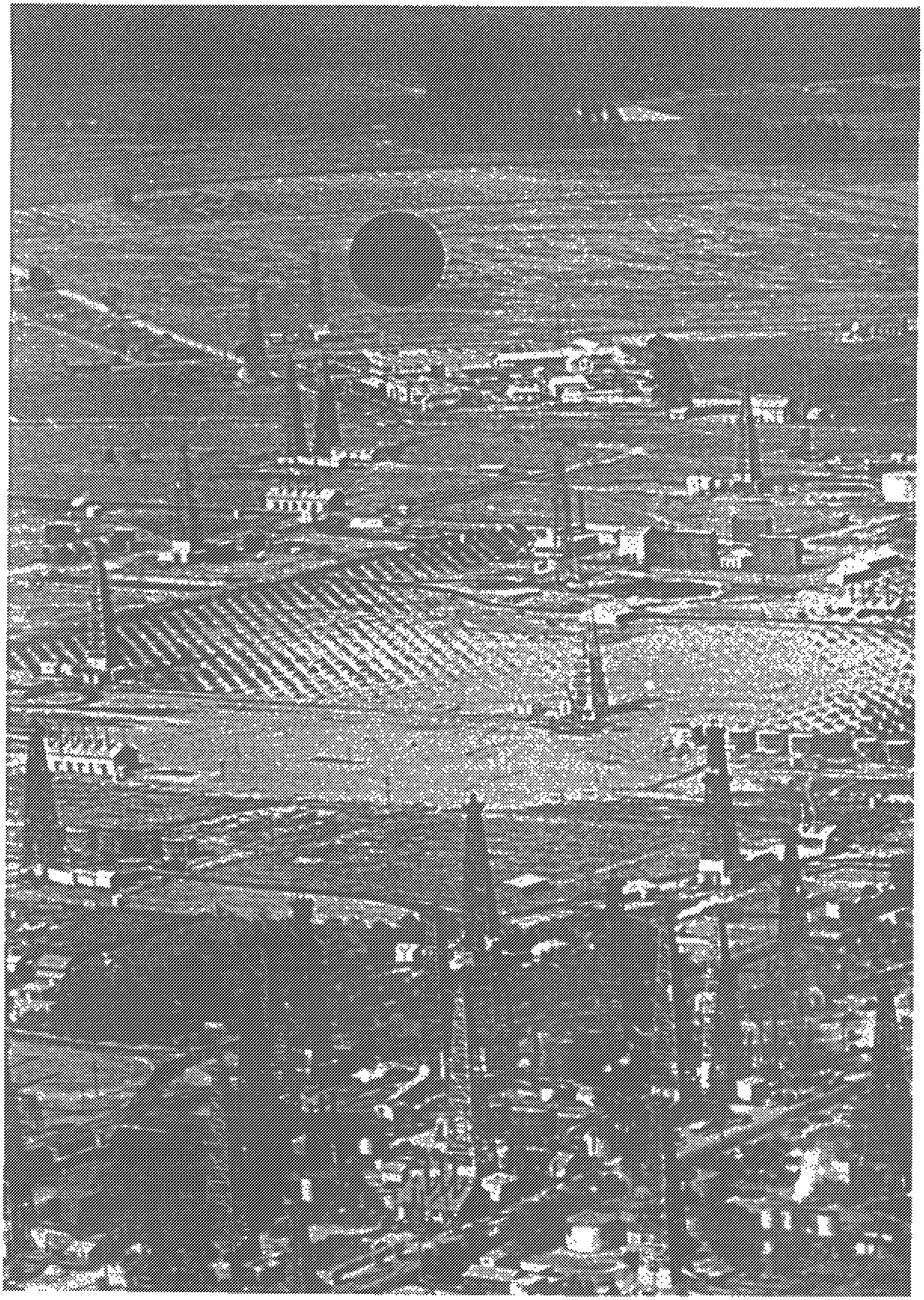
AERIAL PHOTOGRAPH
MARCH 4, 1922

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE C.1

94-255RDISR1 REV. 8/12/93



AERIAL PHOTOGRAPH
JUNE 10, 1923

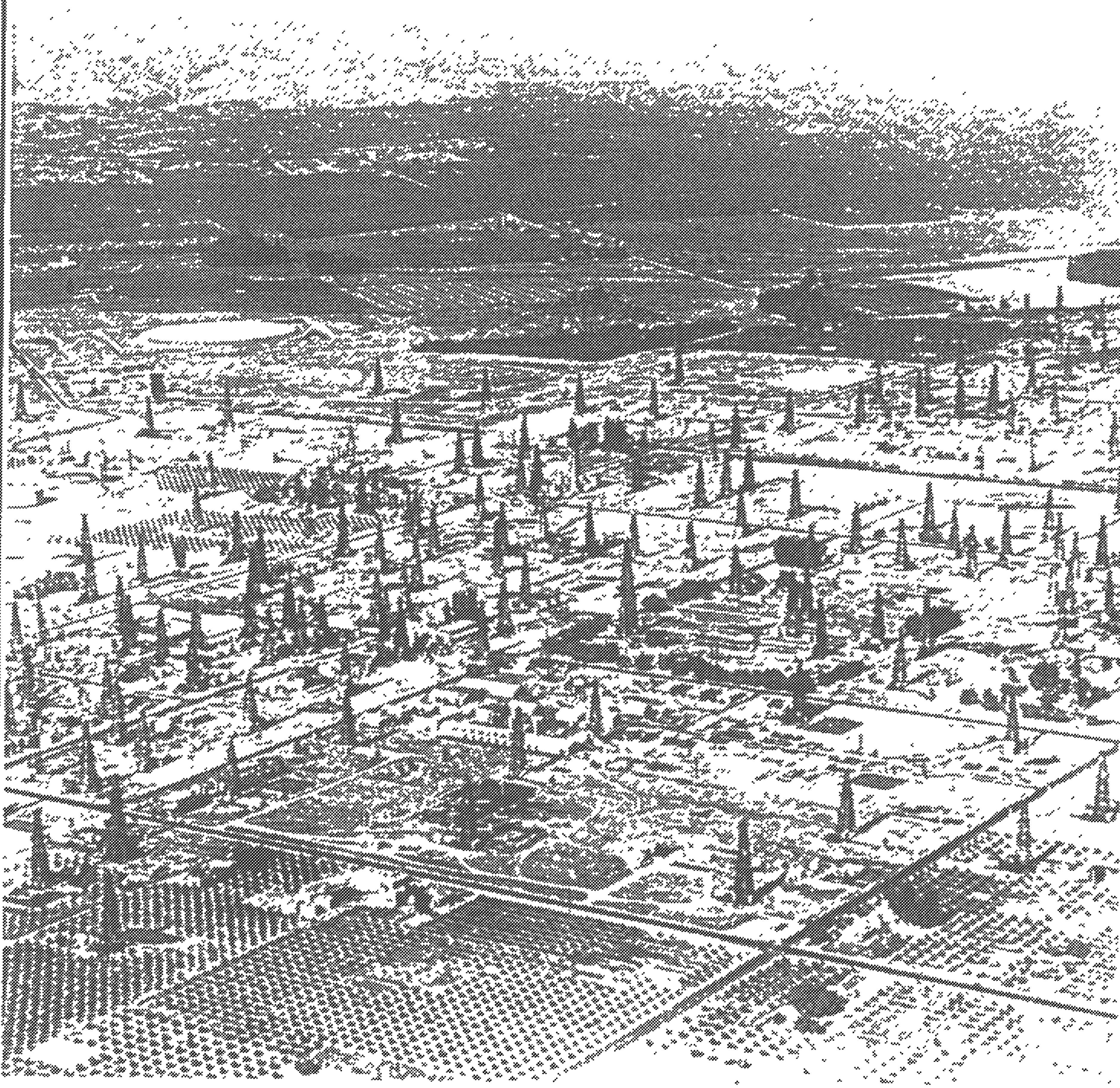
WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.2

AERIAL PHOTOGRAPH
FEBRUARY 13, 1924

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

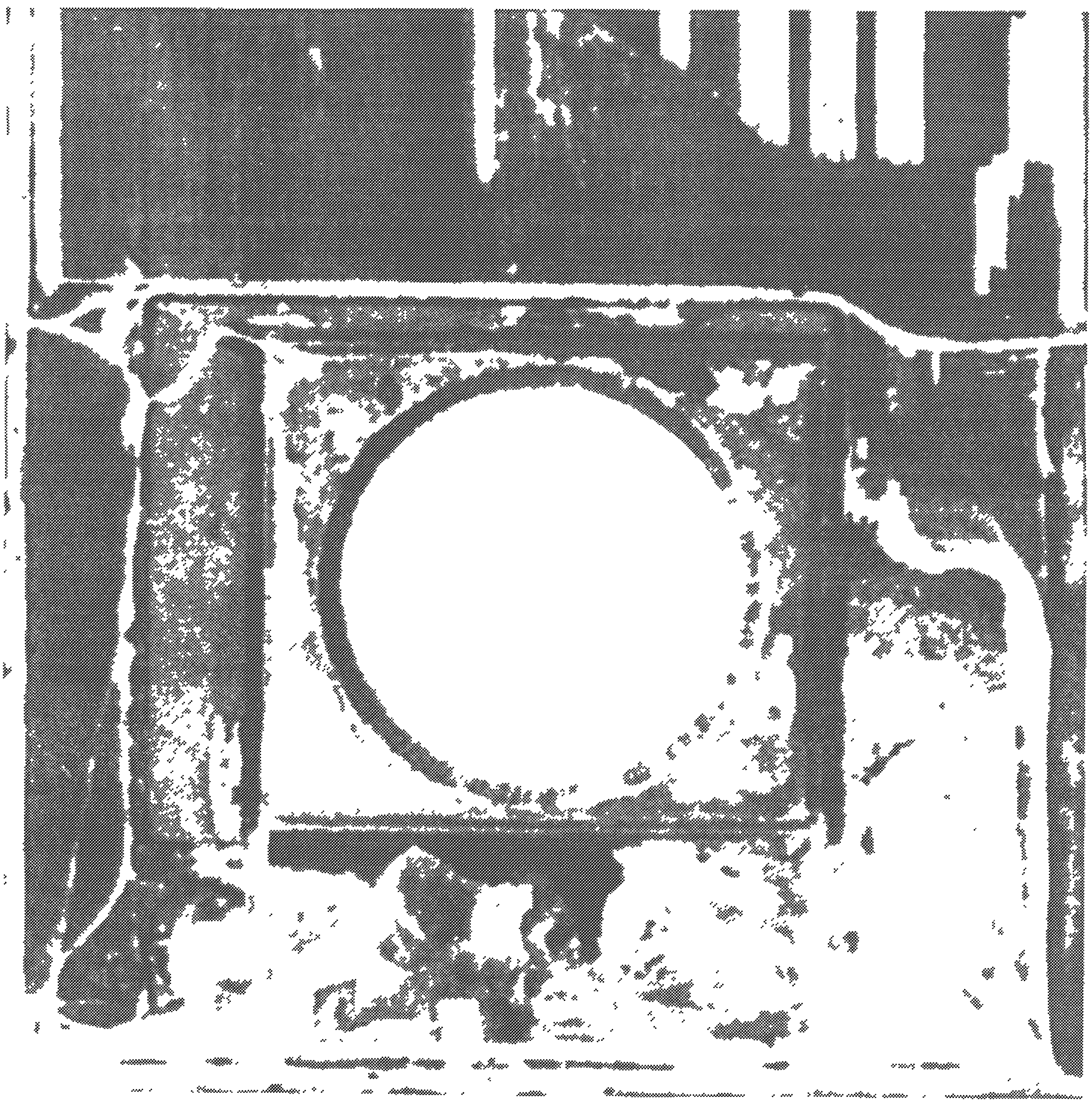
TRC | FIGURE C.3



AERIAL PHOTOGRAPH
JULY 28, 1926

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC	FIGURE C.4



AERIAL PHOTOGRAPH
1928

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC	FIGURE C.5

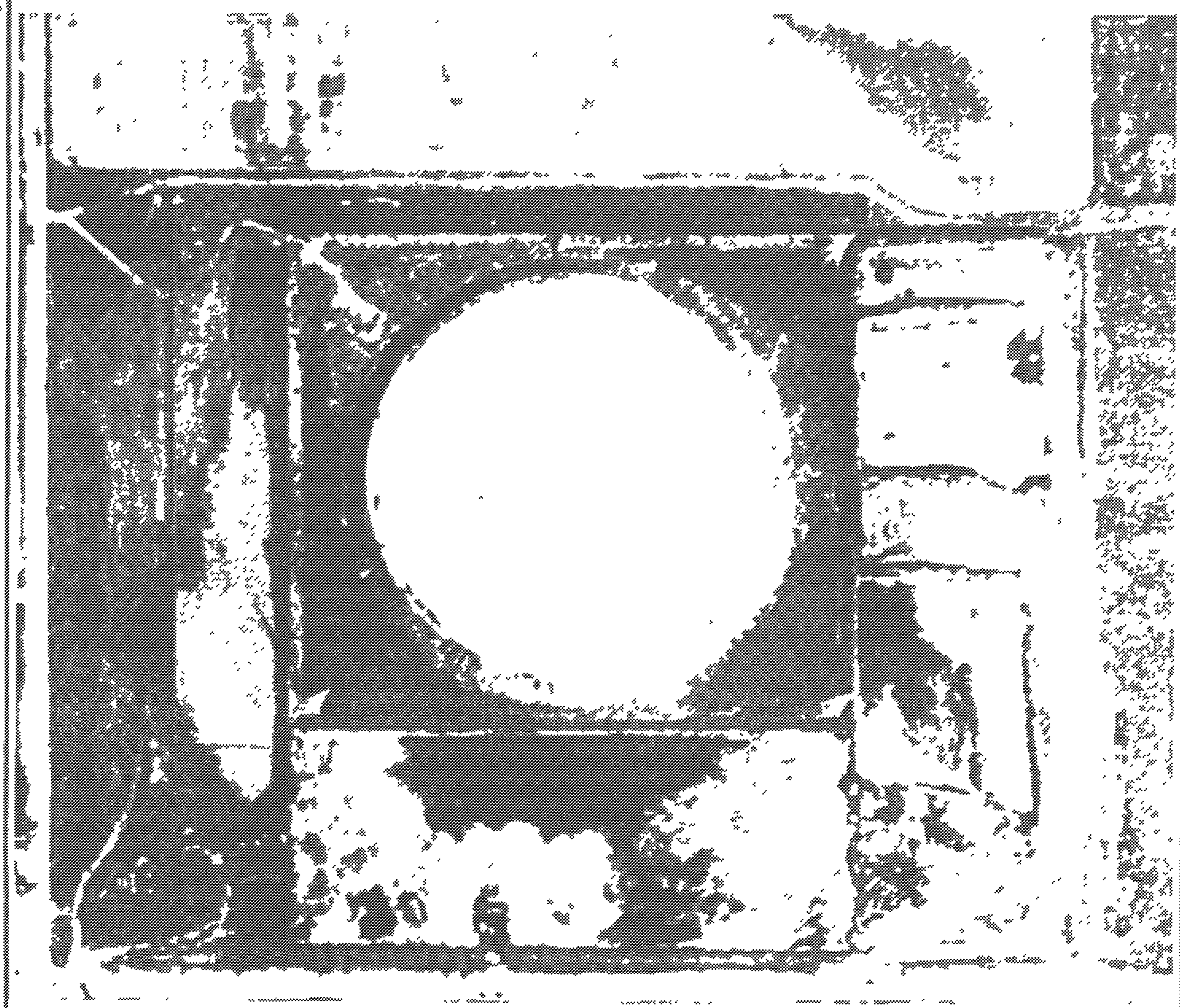
94-256 RDISR1 REV. 8/12/99

AERIAL PHOTOGRAPH
JULY 7, 1933

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.6

94 250RD6R REV 1/1993

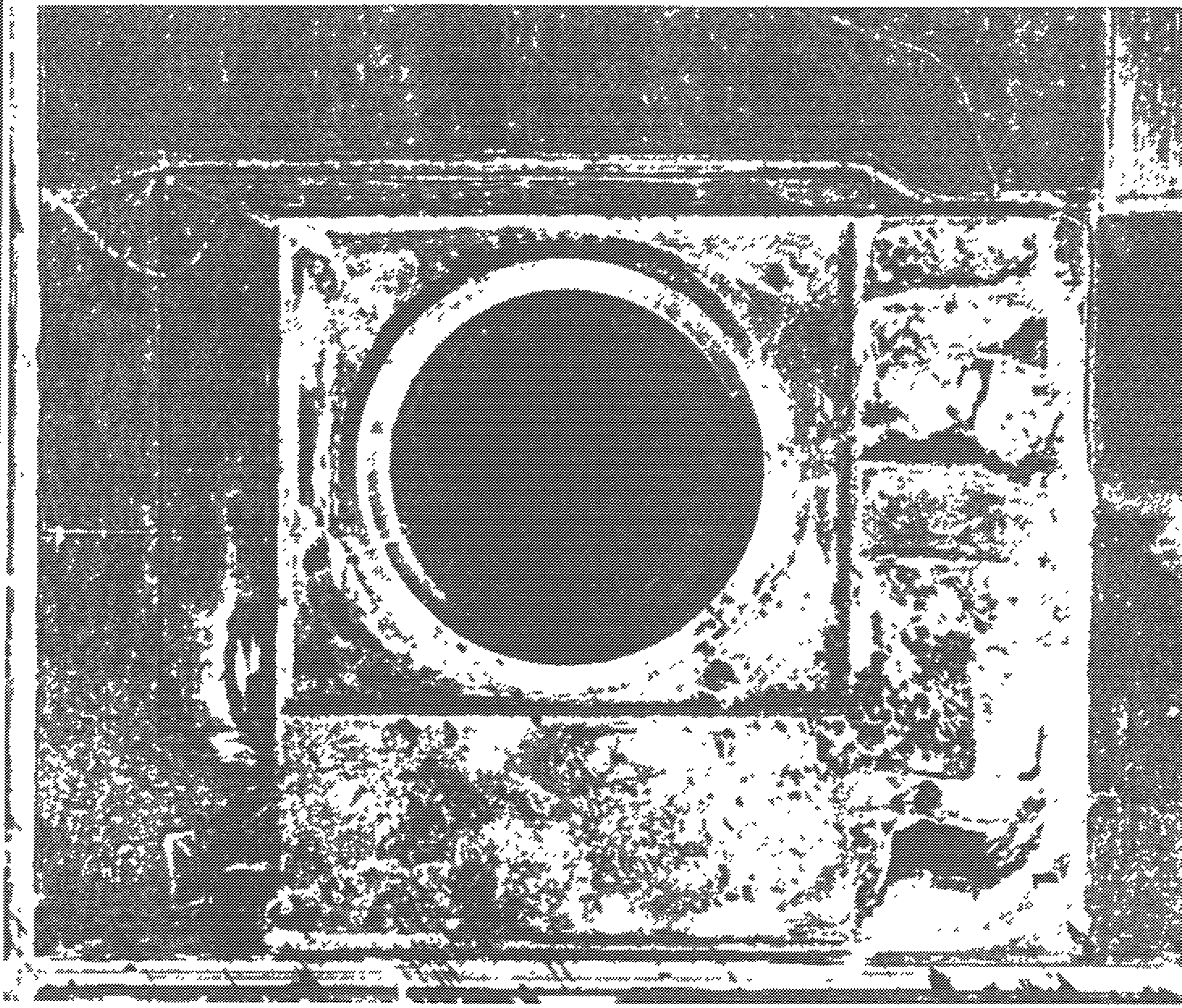


AERIAL PHOTOGRAPH
FEBRUARY 20, 1937

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.7

94-243/R0SR1 RV 8/3/93

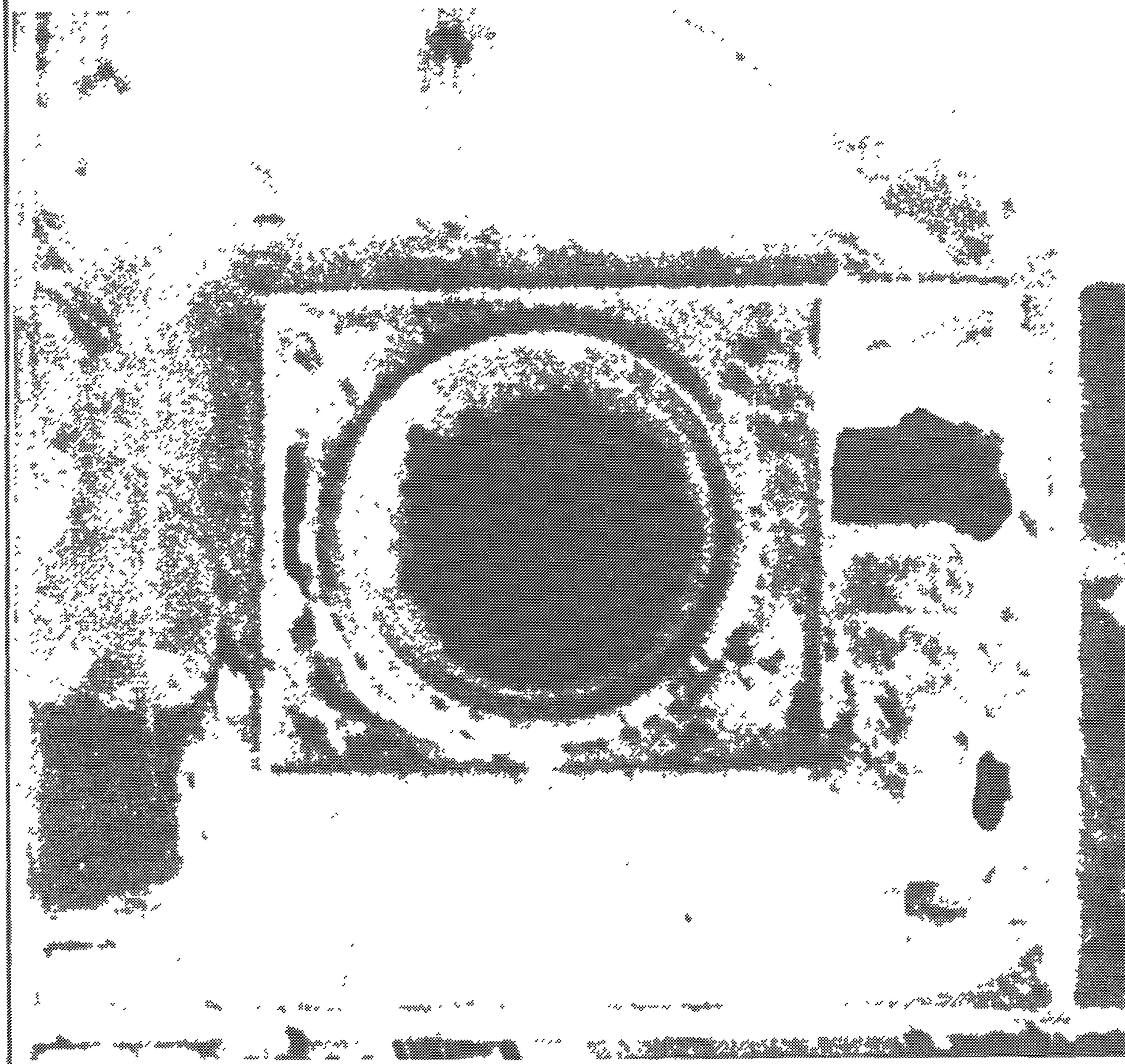


AERIAL PHOTOGRAPH
JANUARY 1, 1945

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

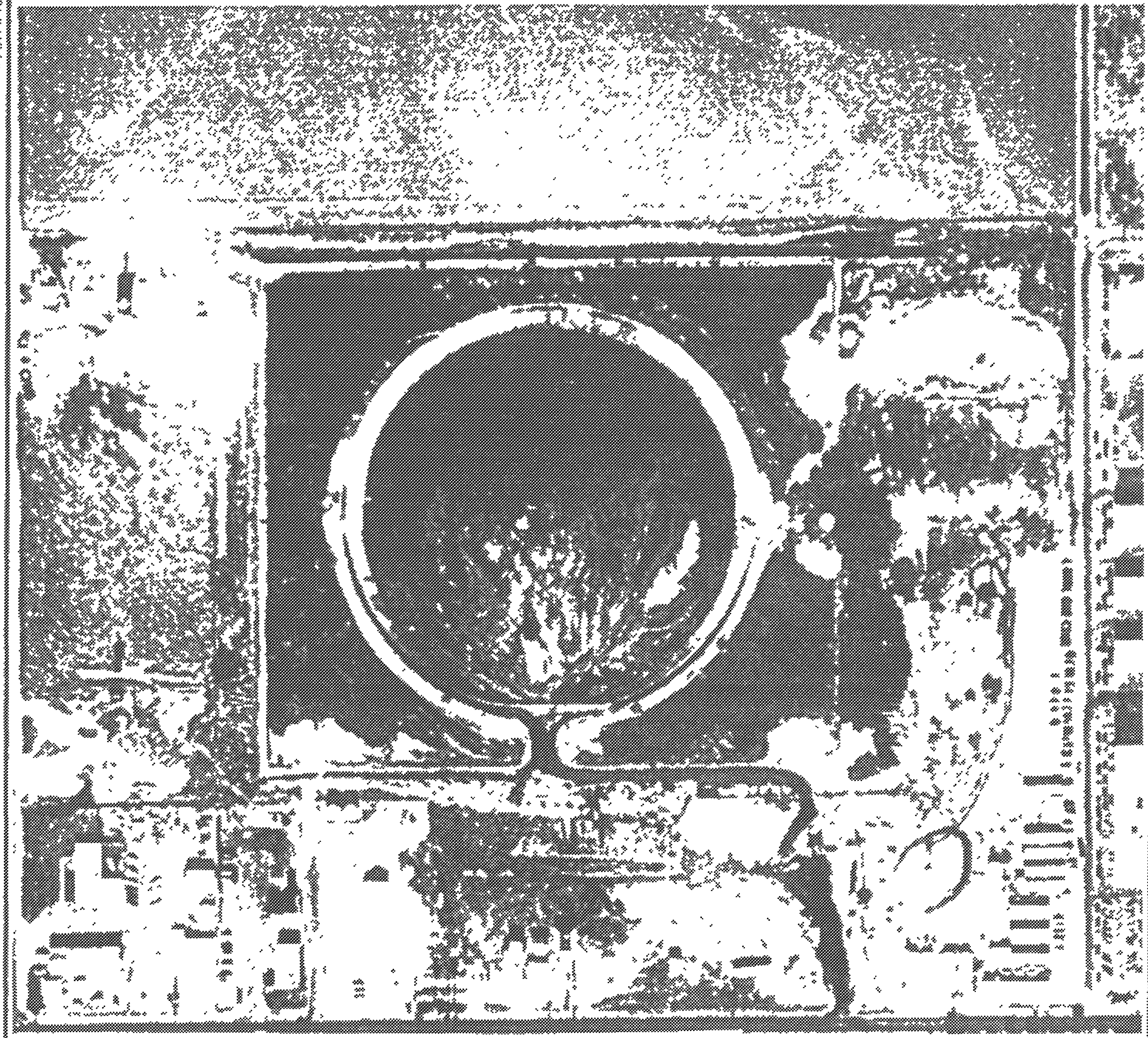
FIGURE C.8



AERIAL PHOTOGRAPH
FEBRUARY 8, 1949

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.9

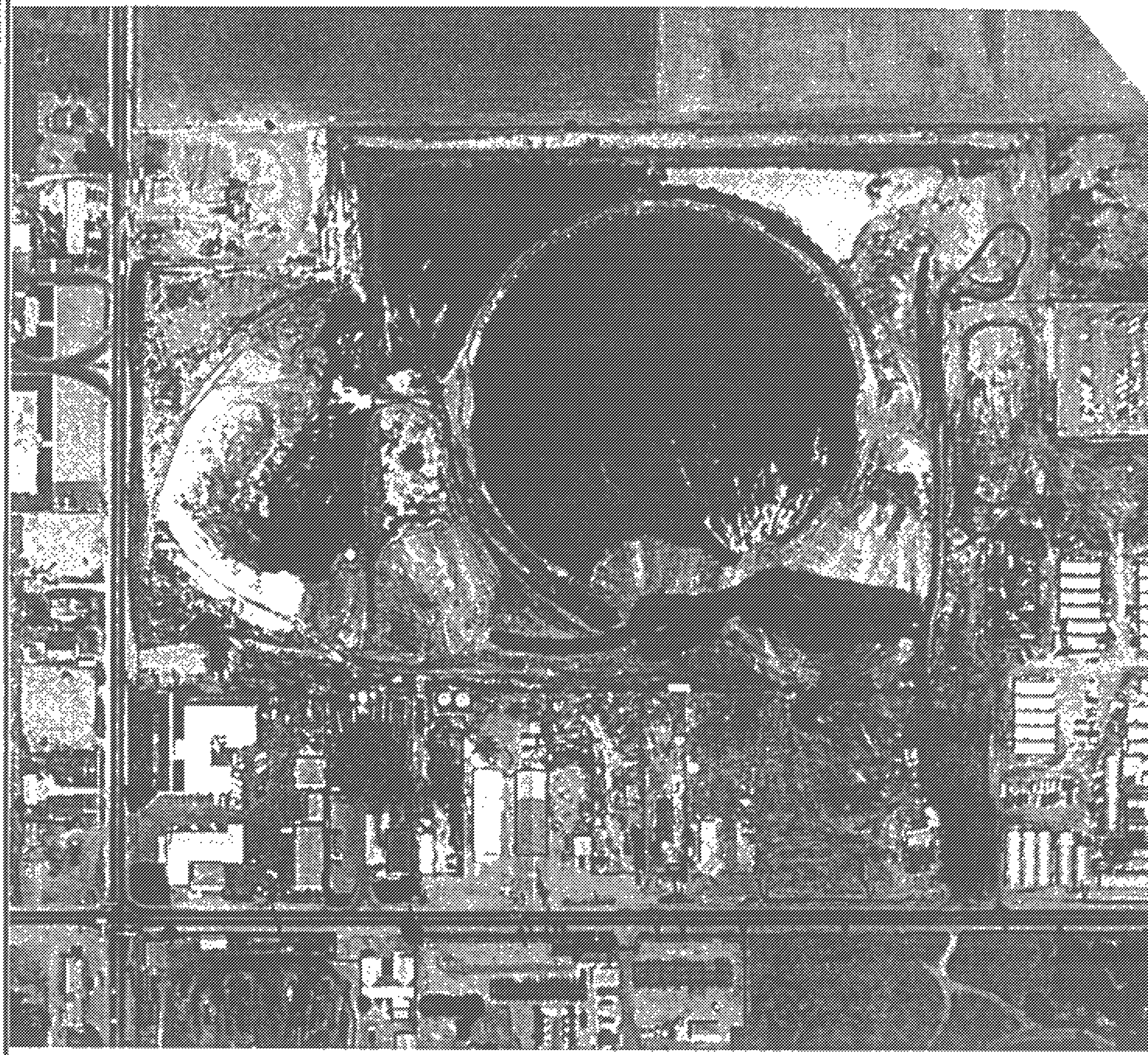


AERIAL PHOTOGRAPH
OCTOBER 19, 1953

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.10

04-2580OSR1: REV. 8/12/89

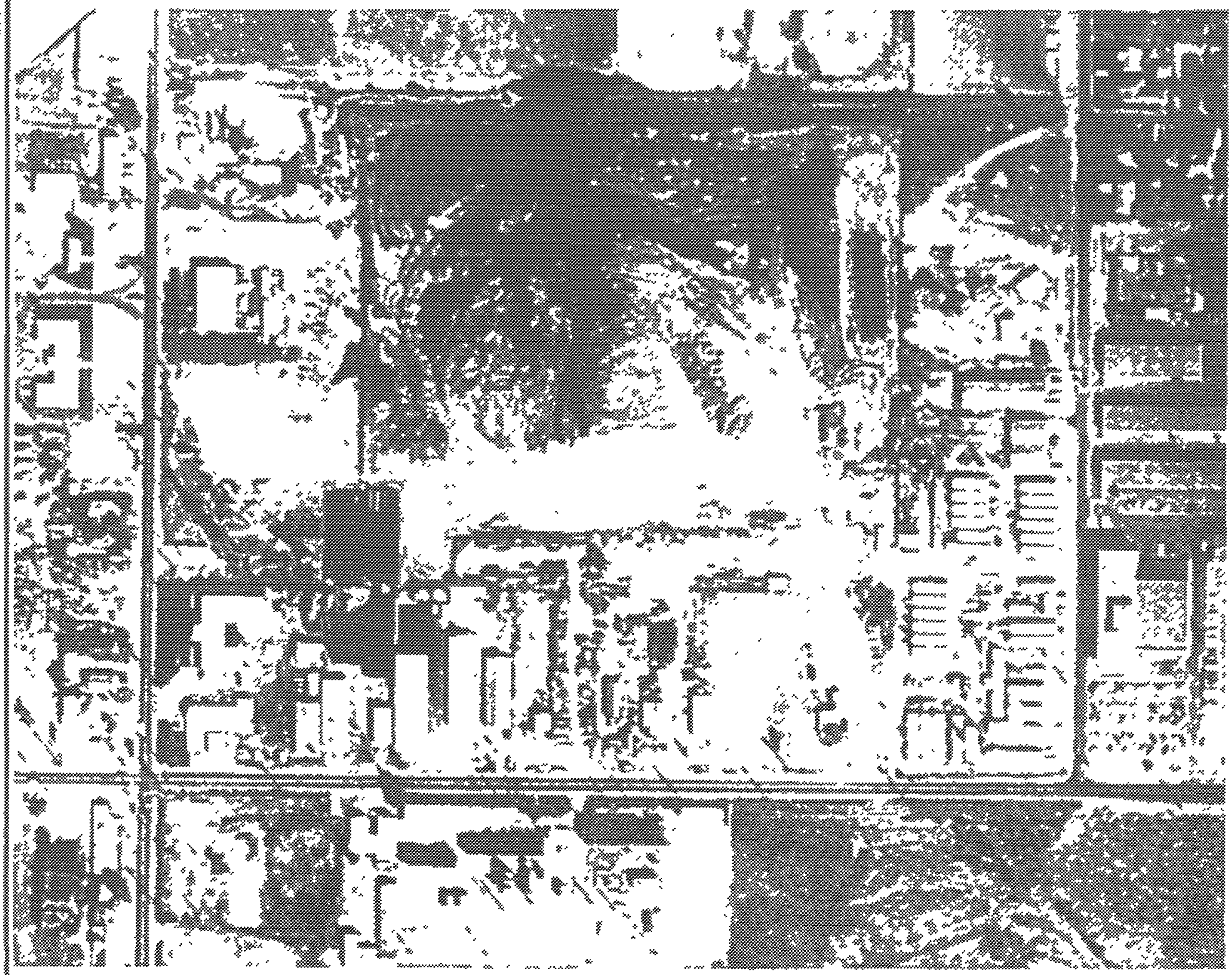


AERIAL PHOTOGRAPH
SEPTEMBER 8, 1958

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.11

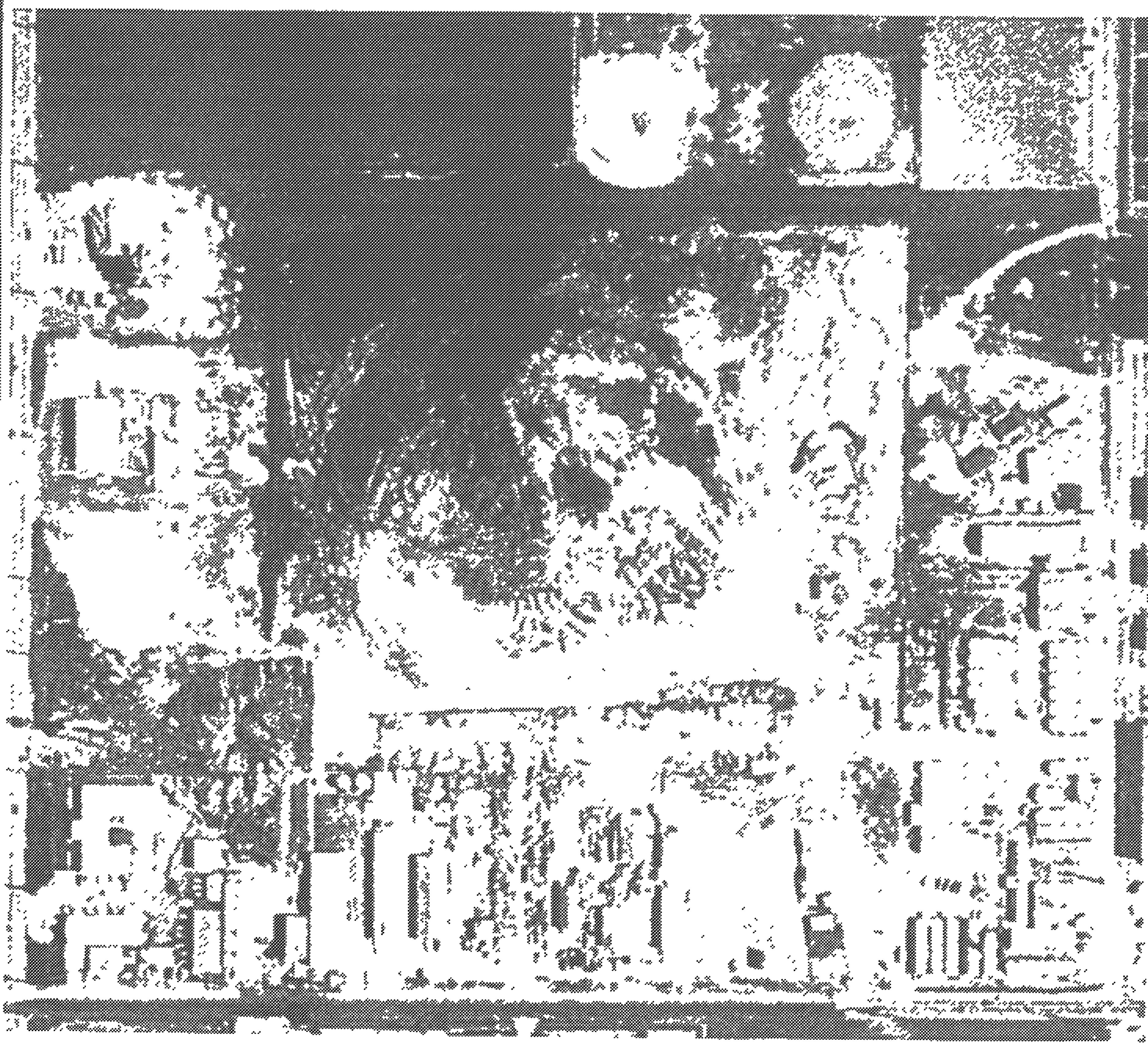
94 27CRDISR1 FLV, 8.1293



AERIAL PHOTOGRAPH
NOVEMBER 20, 1962

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

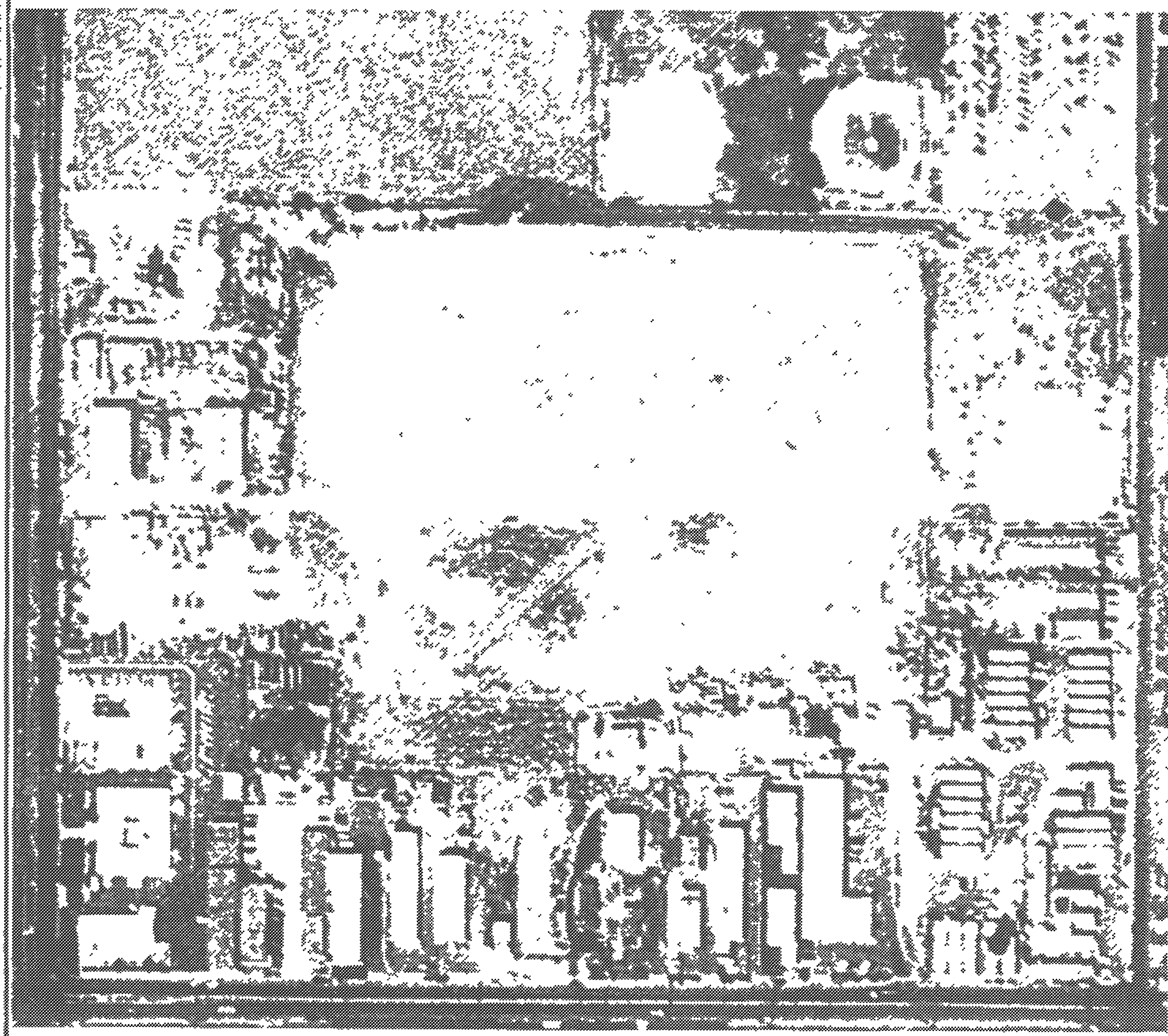
TRC | FIGURE C.12



AERIAL PHOTOGRAPH
FEBRUARY 28, 1963

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.13



AERIAL PHOTOGRAPH
SEPTEMBER 23, 1968

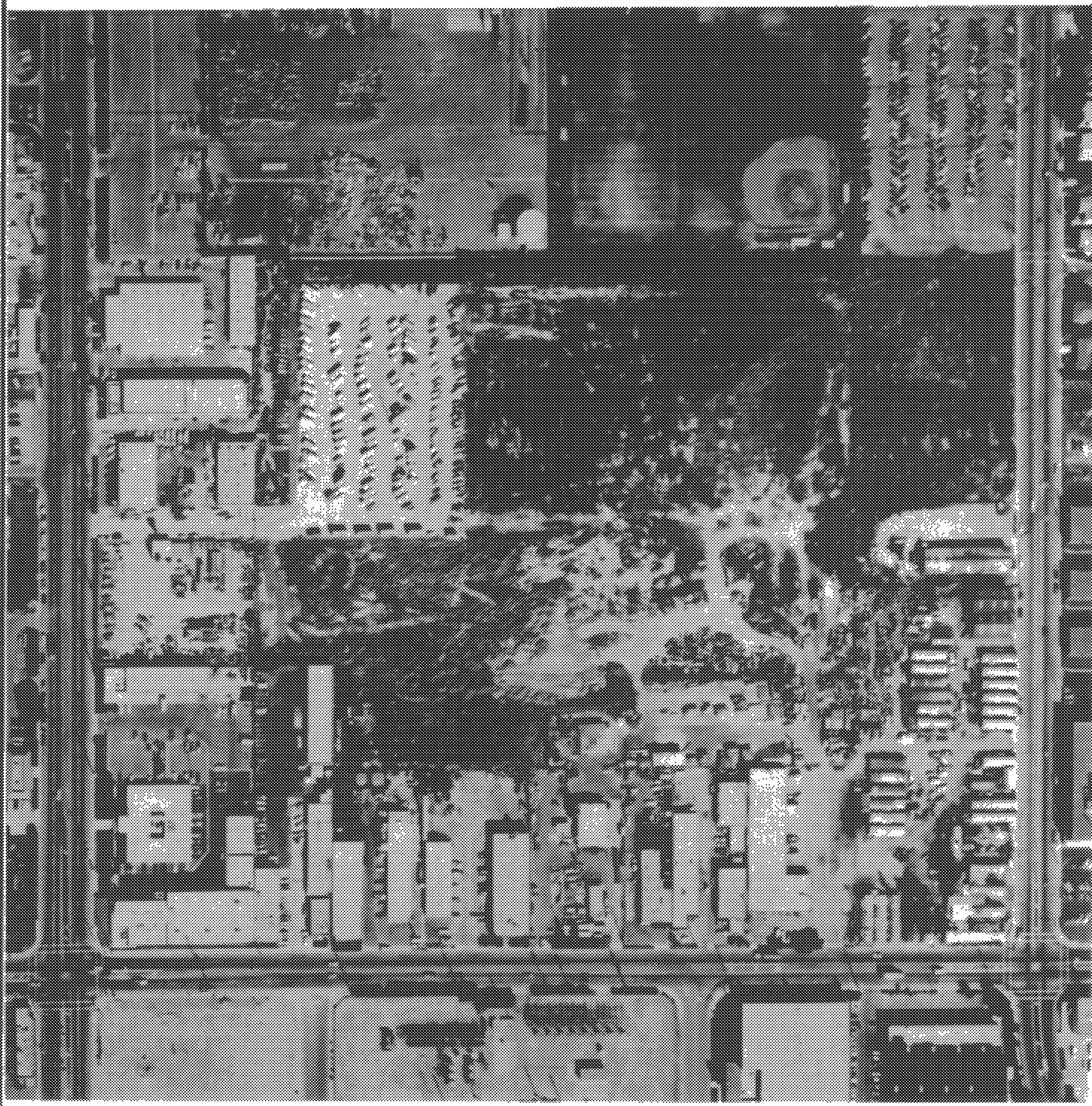
WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.14

AERIAL PHOTOGRAPH
OCTOBER 30, 1972

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.15

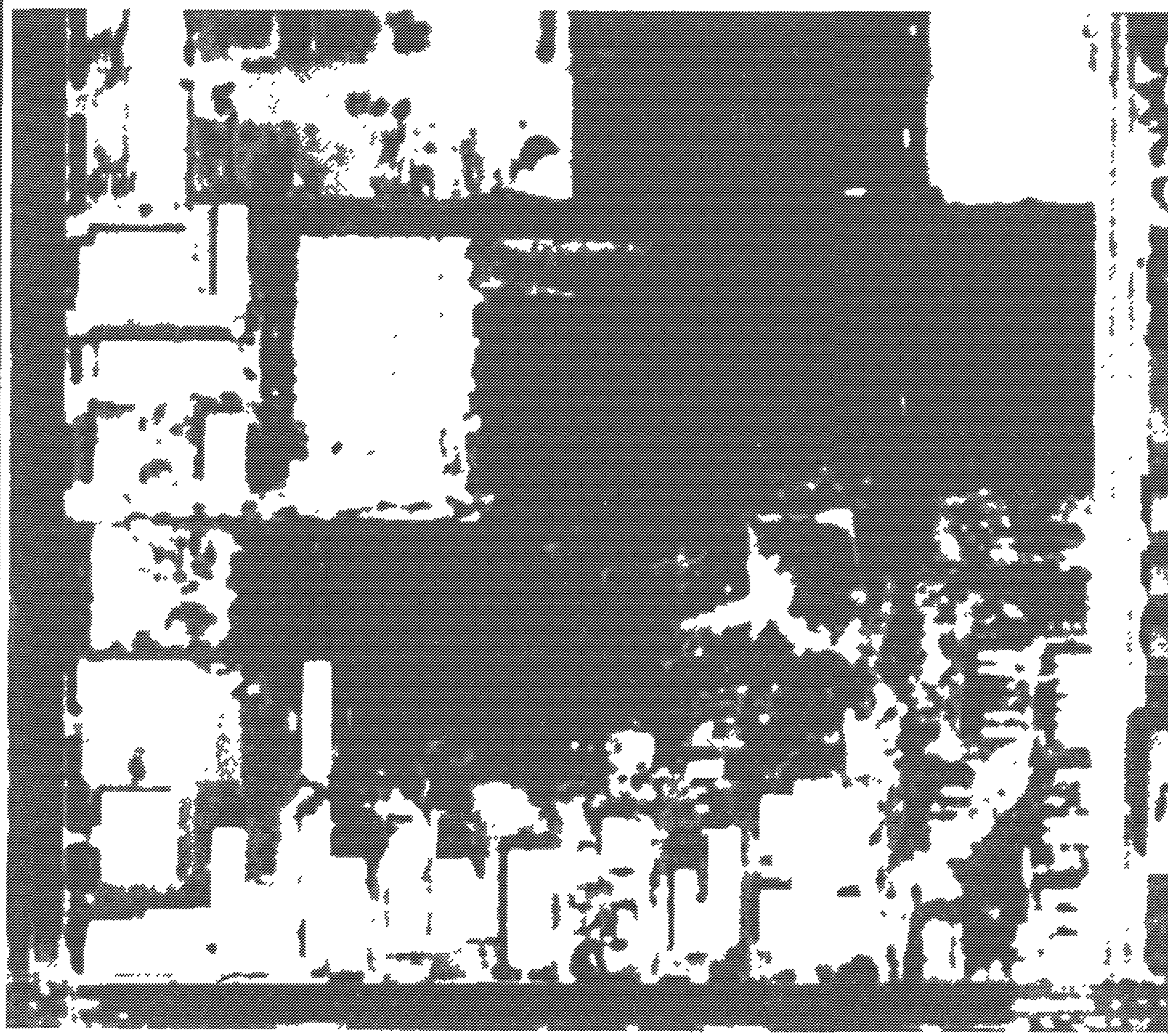


AERIAL PHOTOGRAPH
OCTOBER 27, 1983

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.16

84-250RDISR1 REV 8/12/99



AERIAL PHOTOGRAPH
FEBRUARY 10, 1985

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.17

AERIAL PHOTOGRAPH
NOVEMBER 20, 1987

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC

FIGURE C.18

AERIAL PHOTOGRAPH
AUGUST 5, 1998

WASTE DISPOSAL, INC.
SANTA FE SPRINGS, CALIFORNIA

TRC | FIGURE C.19